

## **Appendix D**

### **EFDC Water Quality Model Baseline and TMDL Allocation Results**

Transect graphics are presented in this appendix showing the EFDC model calculated concentrations of daily average dissolved oxygen, minimum dissolved oxygen, total nitrogen, and total phosphorus for the impaired stream segments in the Christina River Basin. In Delaware waters, the 80<sup>th</sup> percentile model concentrations of total nitrogen and total phosphorus are compared with the TMDL endpoint targets of 3.0 mg/L and 0.2 mg/L, respectively. In Pennsylvania, the minimum and daily average dissolved oxygen concentrations are compared with the water quality standards.

**Table D-1. Stream reaches included in EFDC water quality model.**

| Stream Reach                       | River Mile at Mouth | River Mile at Upstream Extent |
|------------------------------------|---------------------|-------------------------------|
| Christina River (lower)            | 74.2                | 89.6                          |
| Christina River (upper)            | 89.6                | 103.0                         |
| Christina River West Branch        | 98.5                | 100.4                         |
| Brandywine Creek (main stem)       | 76.3                | 95.8                          |
| Brandywine Creek East Branch       | 95.8                | 113.7                         |
| Brandywine Creek West Branch       | 95.8                | 120.7                         |
| Buck Run                           | 106.6               | 117.3                         |
| Red Clay Creek and East Branch     | 87.6                | 104.9                         |
| Red Clay Creek West Branch         | 100.3               | 104.9                         |
| Burroughs Run                      | 97.1                | 100.2                         |
| White Clay Creek and Middle Branch | 85.6                | 109.7                         |
| White Clay Creek East Branch       | 99.9                | 107.1                         |
| Little Mill Creek                  | 79.8                | 85.4                          |
| Mill Creek                         | 87.9                | 94.7                          |
| Pike Creek                         | 90.6                | 95.9                          |
| Muddy Run                          | 93.2                | 95.9                          |
| Delaware River                     | 62.6                | 86.5                          |

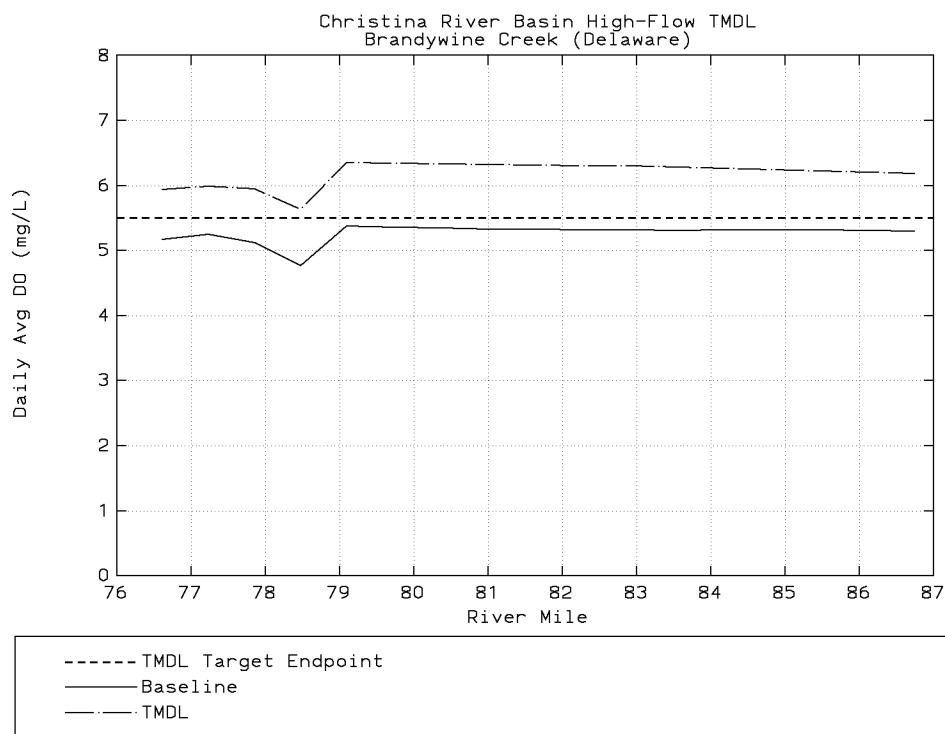


Figure D-1. Baseline and TMDL Daily Average DO, Brandywine Creek (Delaware)

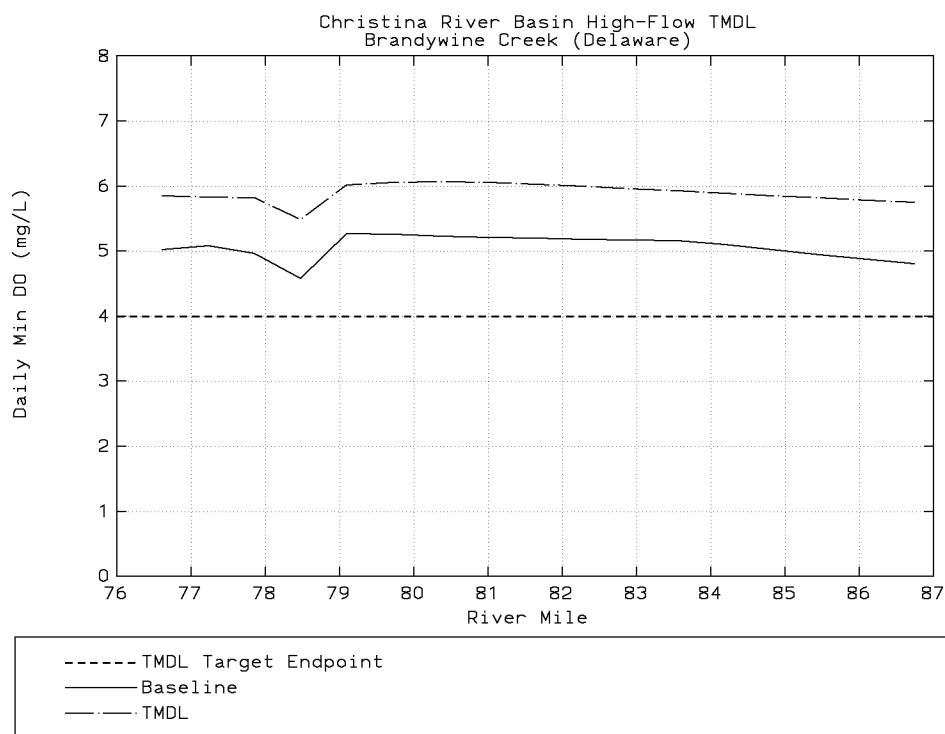


Figure D-2. Baseline and TMDL Minimum DO, Brandywine Creek (Delaware)

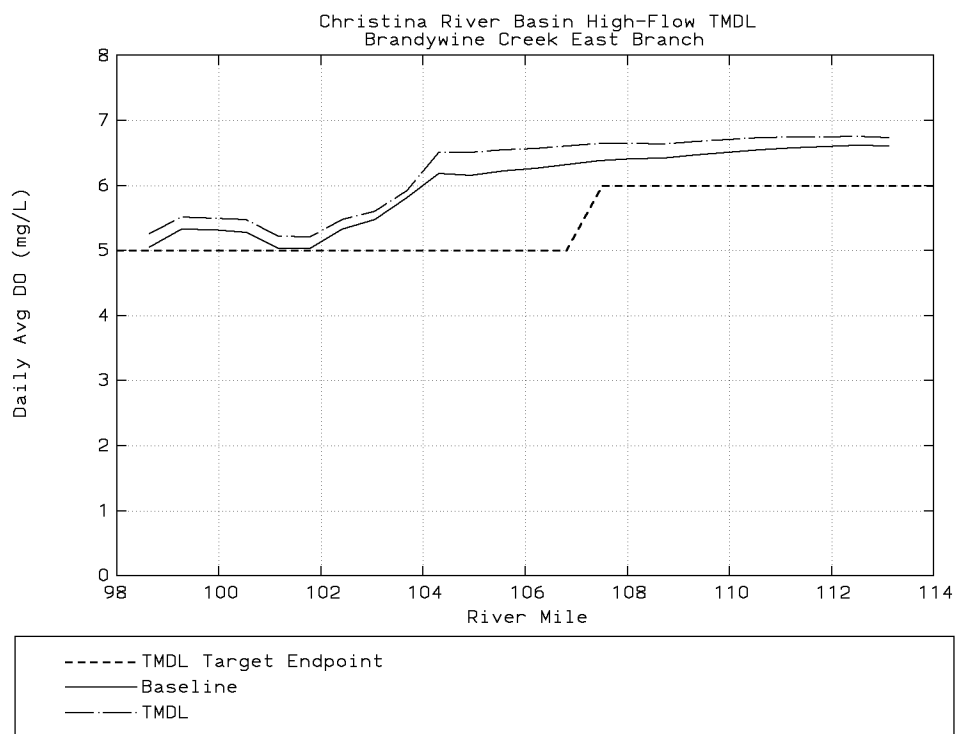


Figure D-3. Baseline and TMDL Daily Average DO, Brandywine Creek East Branch

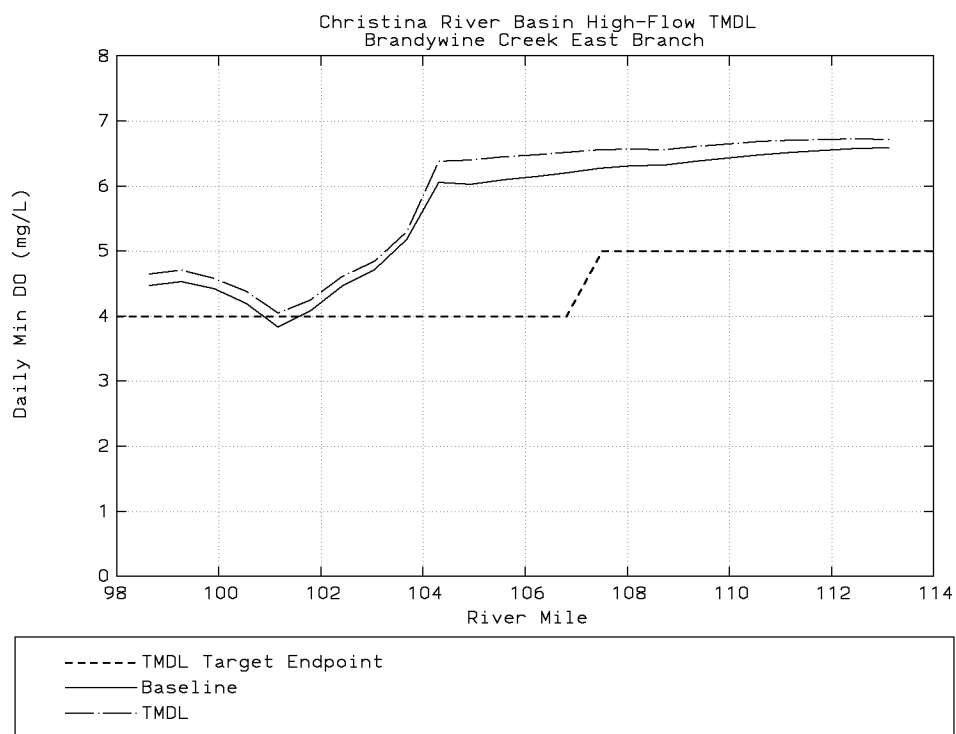


Figure D-4. Baseline and TMDL Minimum DO, Brandywine Creek East Branch

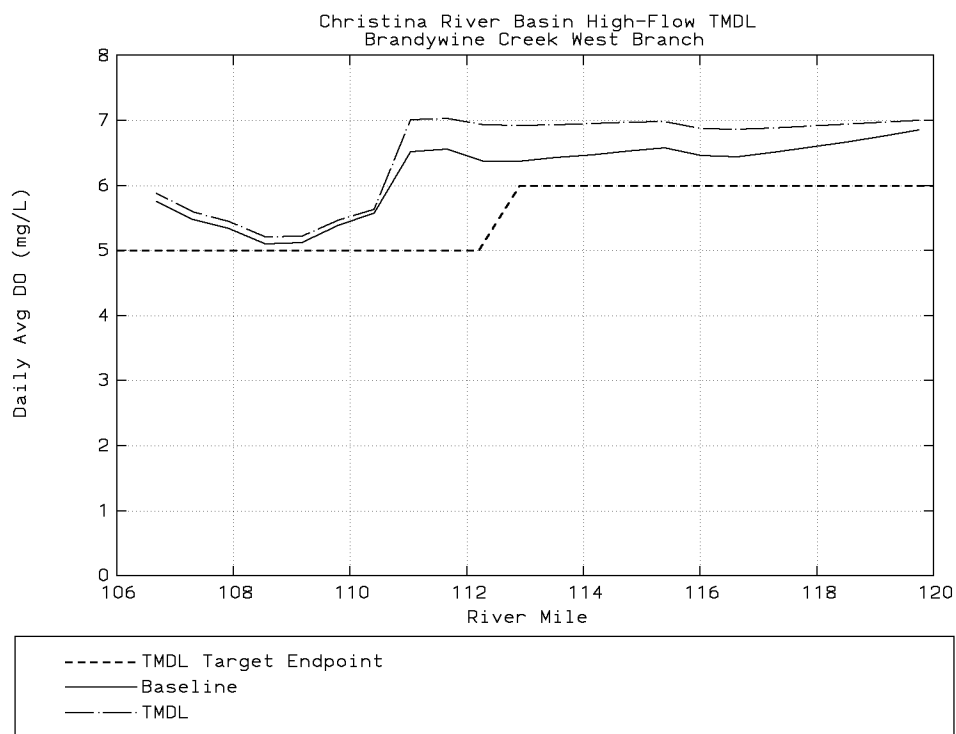


Figure D-5. Baseline and TMDL Daily Average DO, Brandywine Creek West Branch

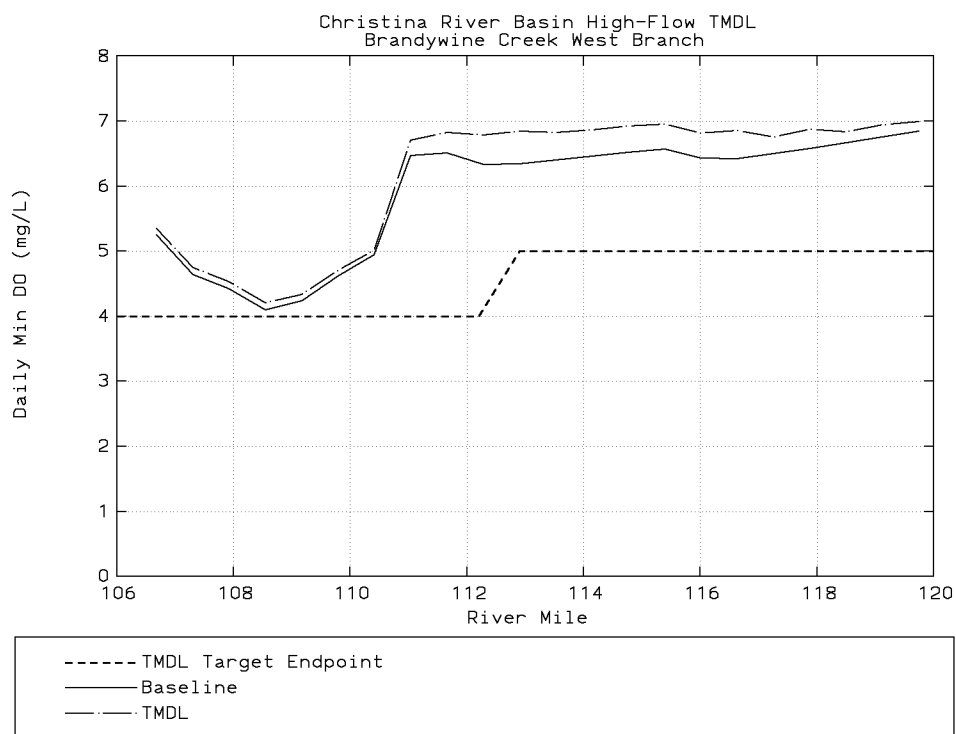


Figure D-6. Baseline and TMDL Minimum DO, Brandywine Creek West Branch

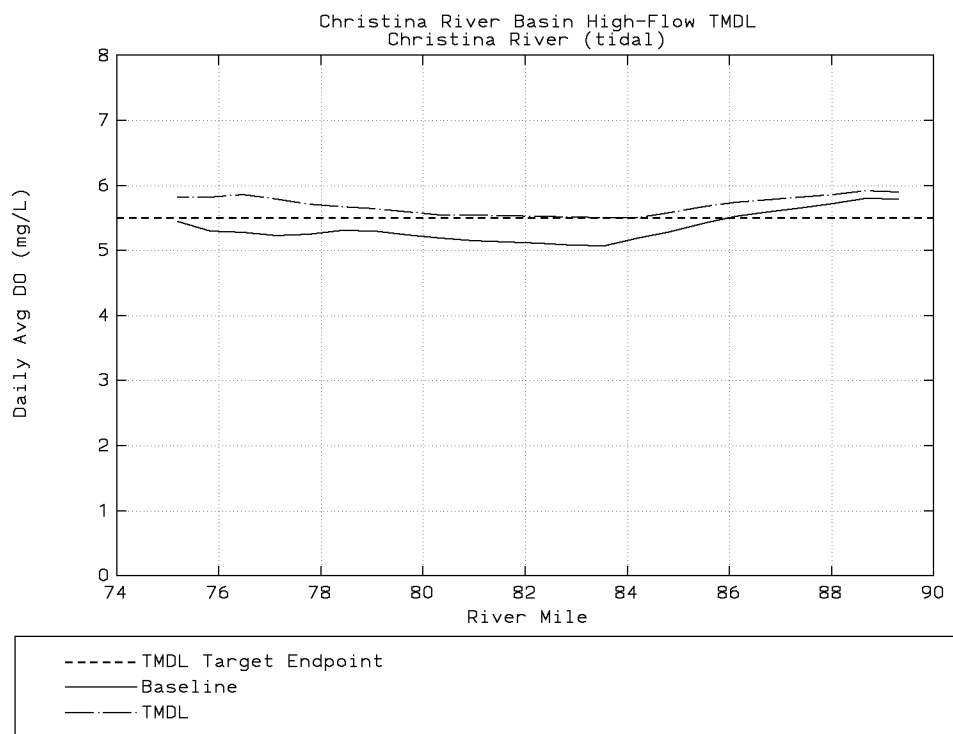


Figure D-7. Baseline and TMDL Daily Average DO, Christina River (tidal)

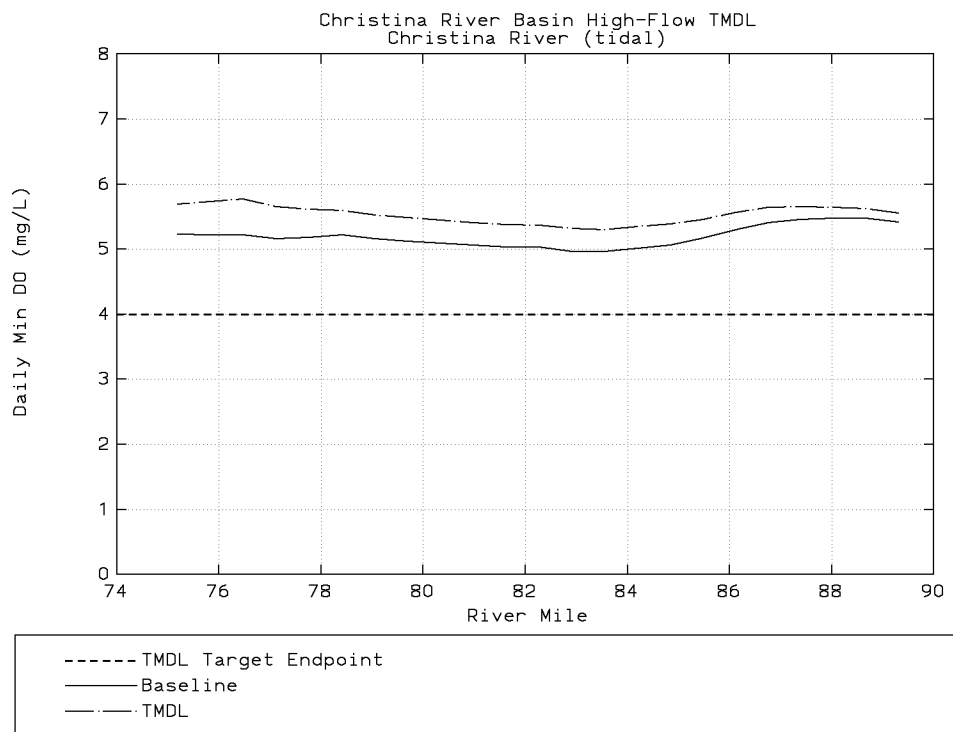


Figure D-8. Baseline and TMDL Minimum DO, Christina River (tidal)

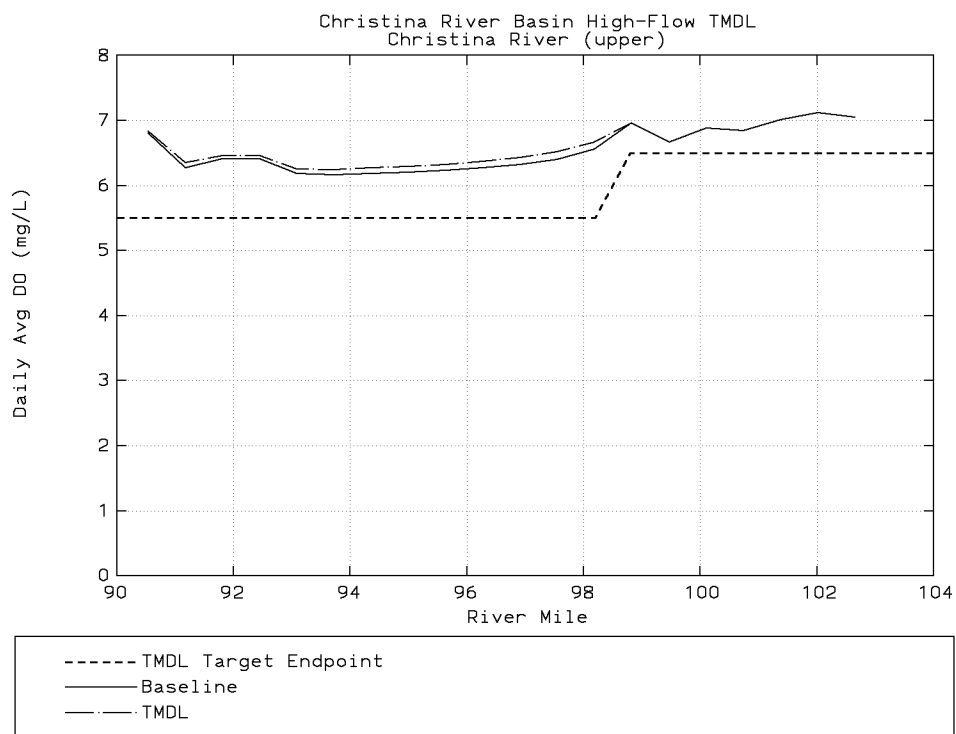


Figure D-9. Baseline and TMDL Daily Average DO, Christina River (upper)

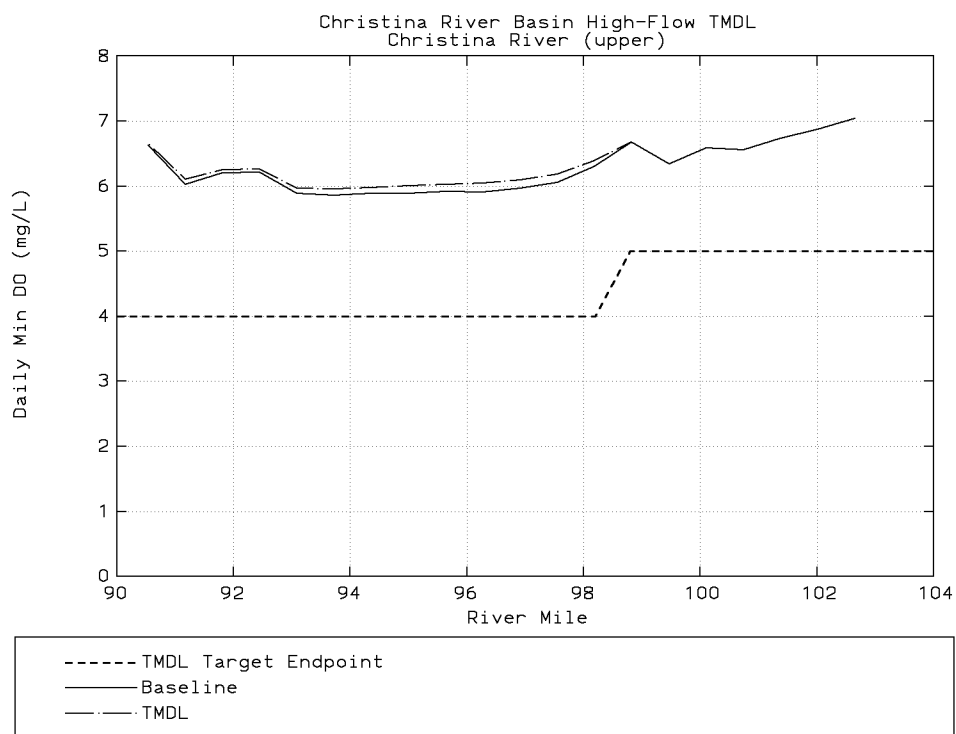


Figure D-10. Baseline and TMDL Minimum DO, Christina River (upper)

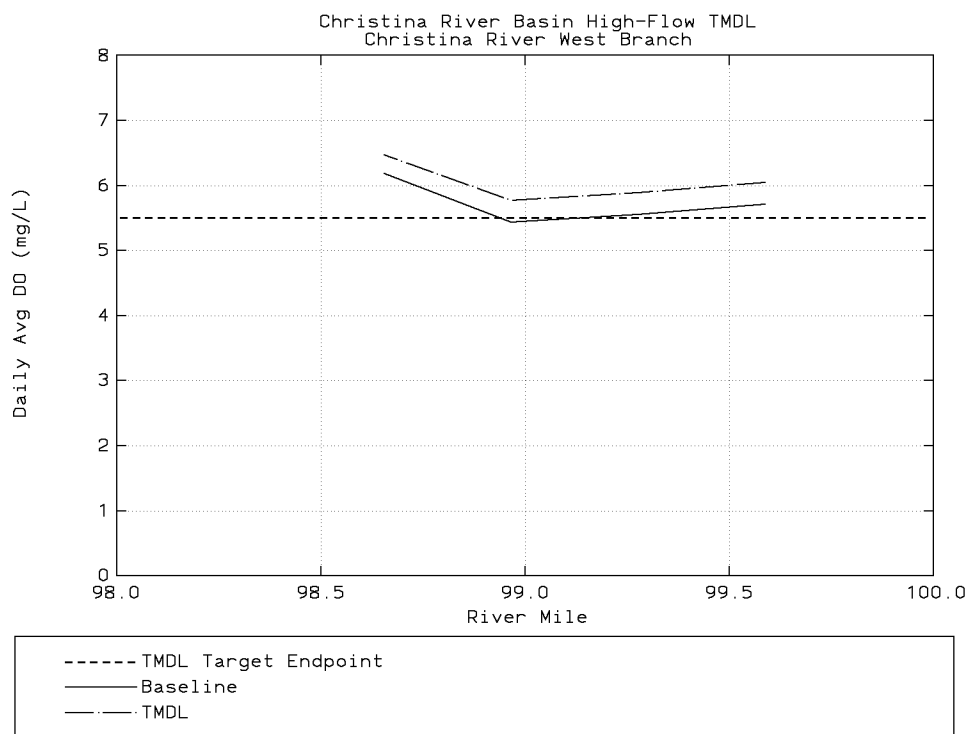


Figure D-11. Baseline and TMDL Daily Average DO, Christina River West Branch

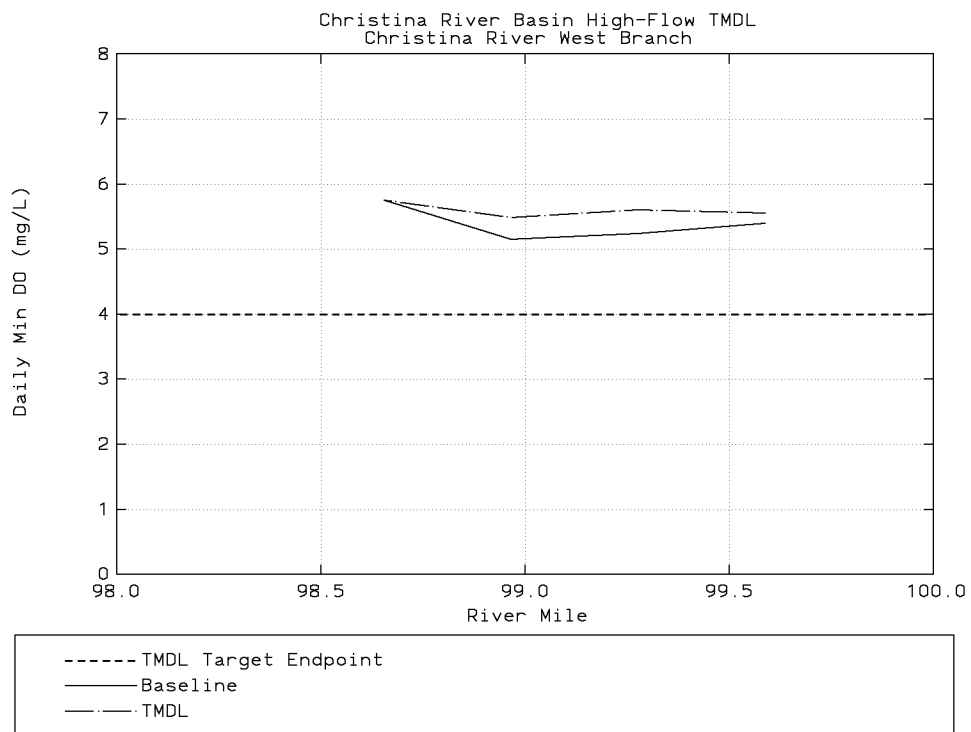


Figure D-12. Baseline and TMDL Minimum DO, Christina River West Branch



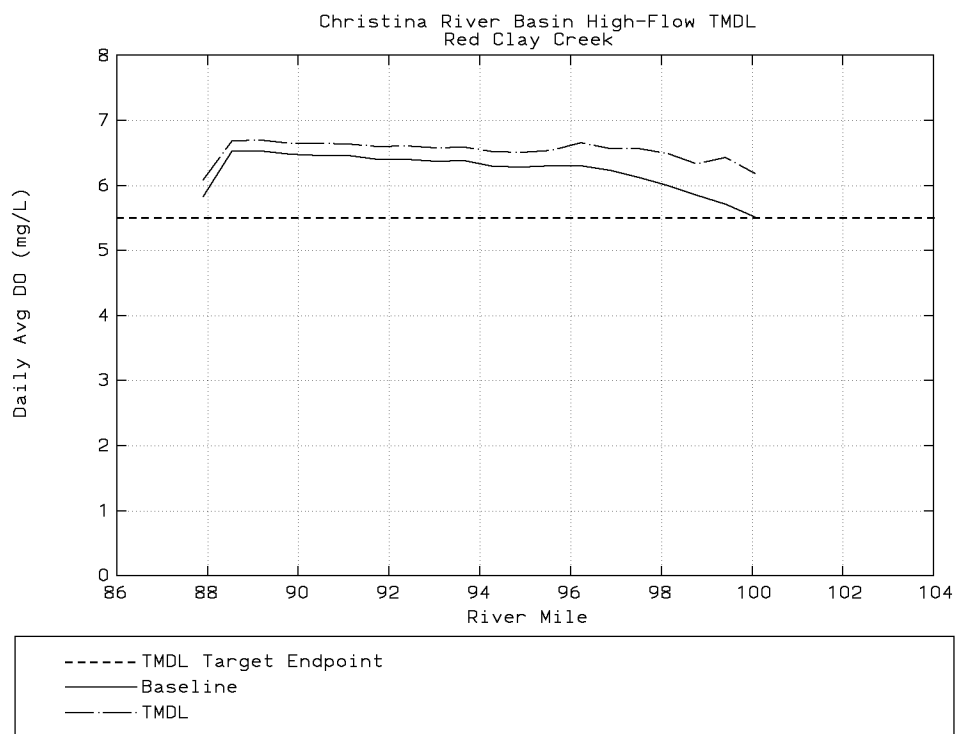


Figure D-13. Baseline and TMDL Daily Average DO, Red Clay Creek

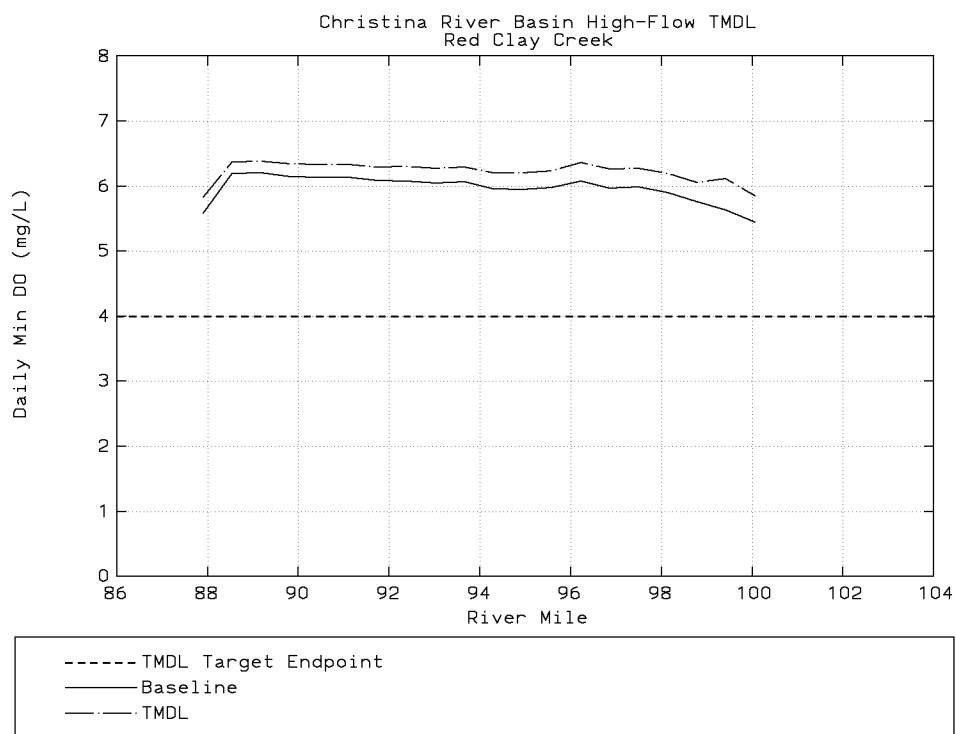


Figure D-14. Baseline and TMDL Minimum DO, Red Clay Creek

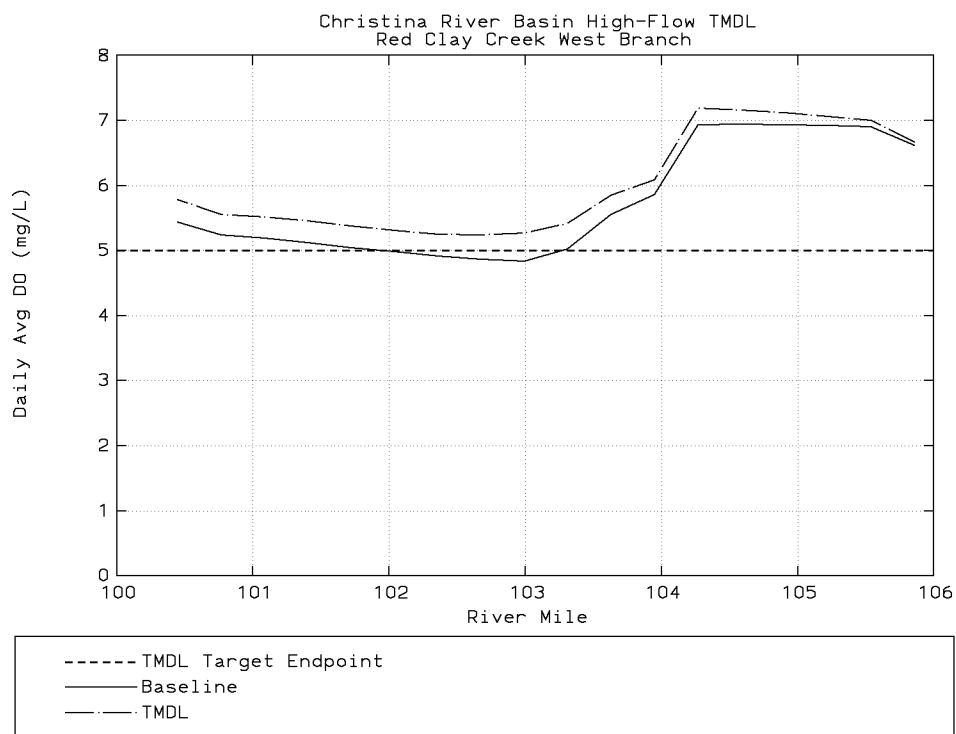


Figure D-15. Baseline and TMDL Daily Average DO, Red Clay Creek West Branch

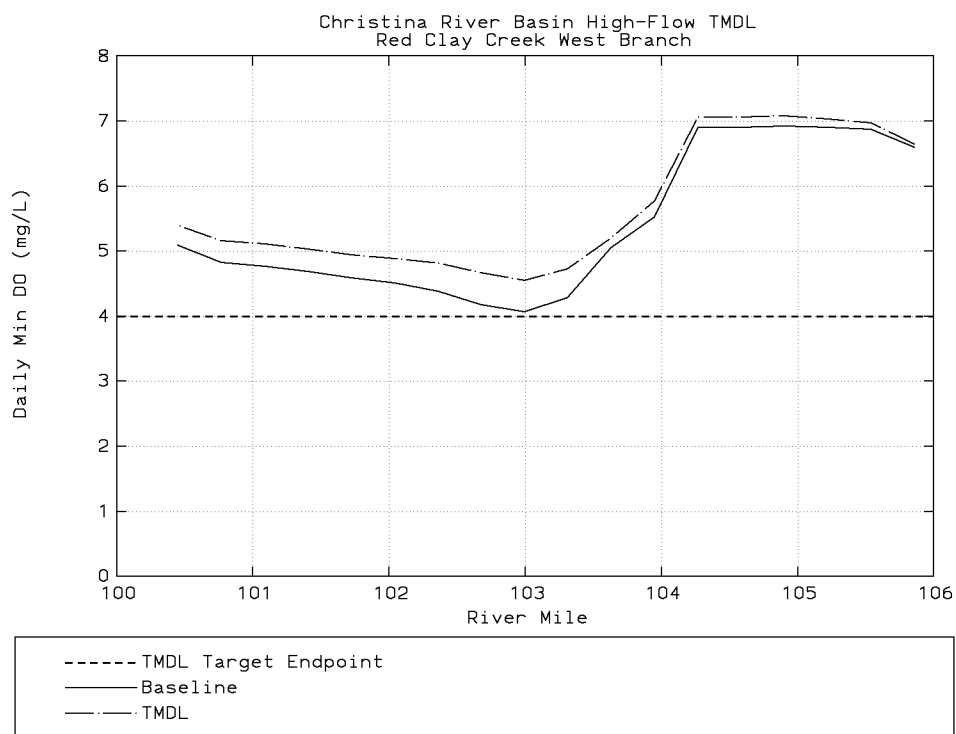


Figure D-16. Baseline and TMDL Minimum DO, Red Clay Creek West Branch

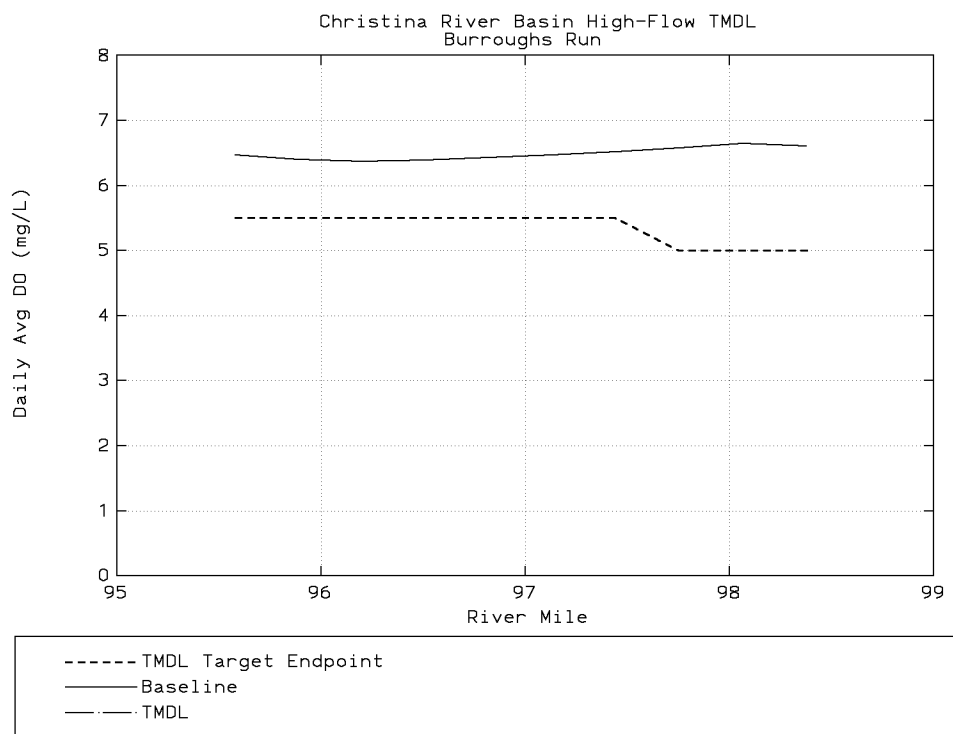


Figure D-17. Baseline and TMDL Daily Average DO, Burroughs Run

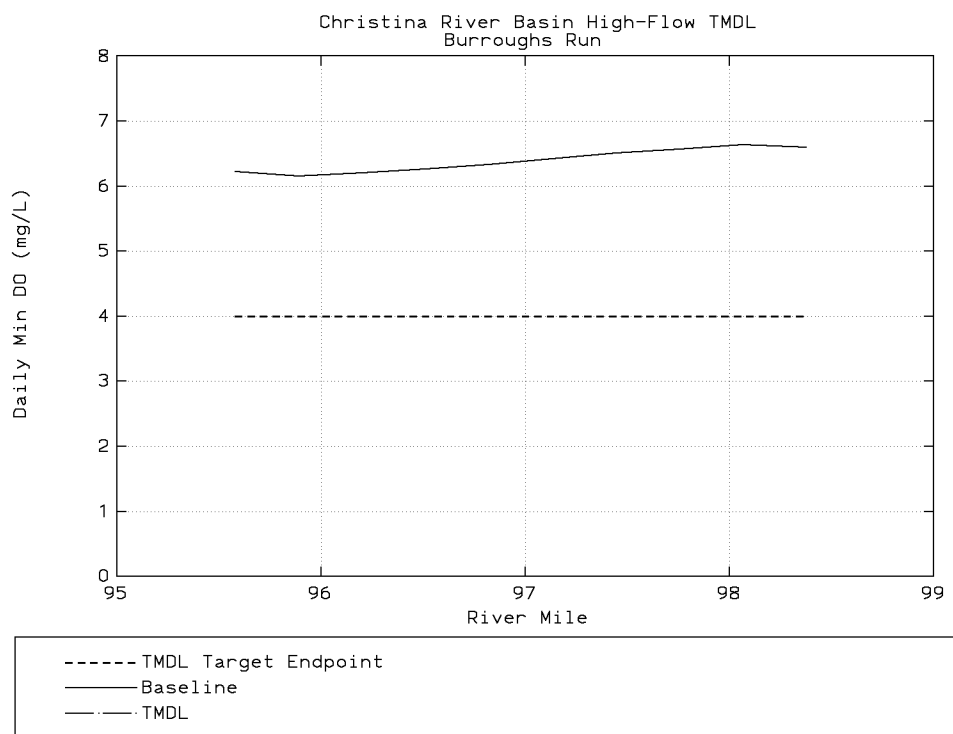


Figure D-18. Baseline and TMDL Minimum DO, Burroughs Run

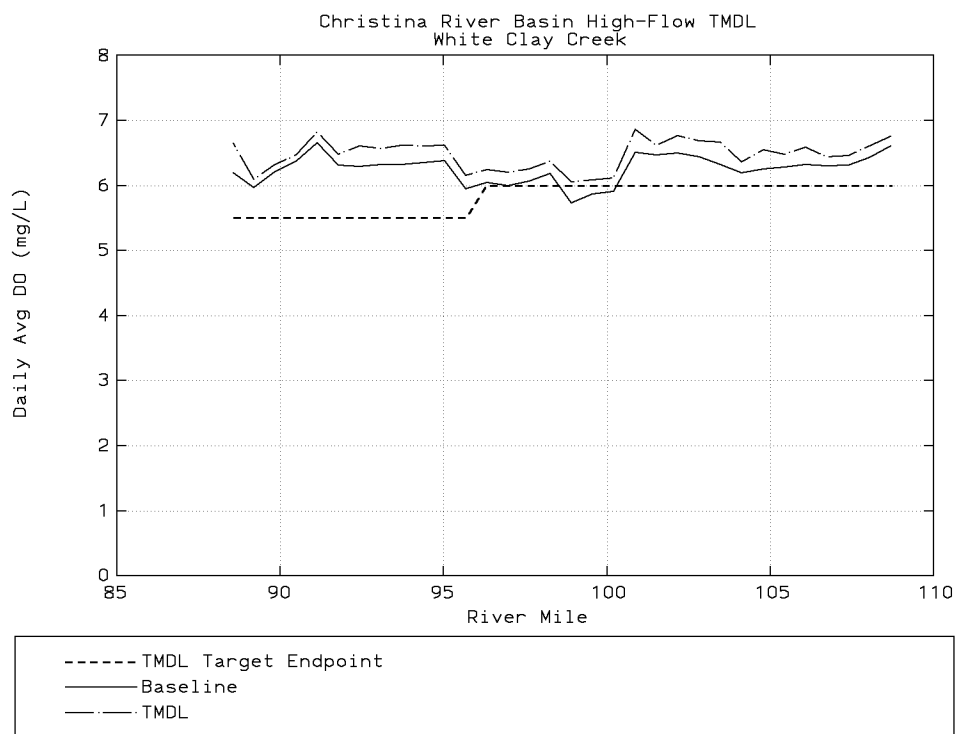


Figure D-19. Baseline and TMDL Daily Average DO, White Clay Creek

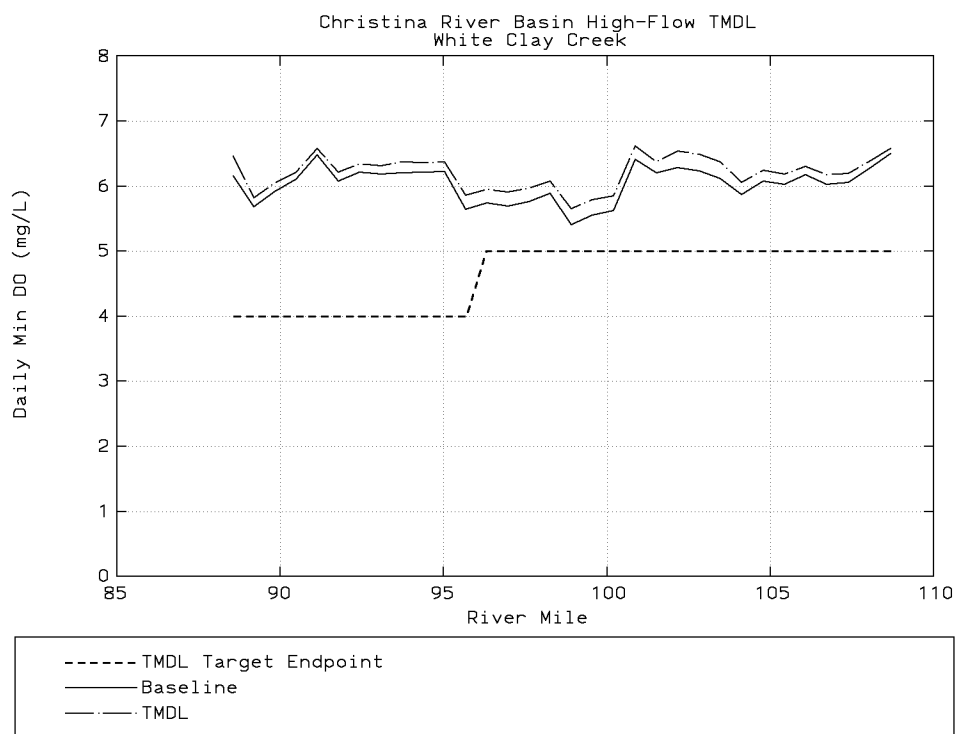


Figure D-20. Baseline and TMDL Minimum DO, White Clay Creek

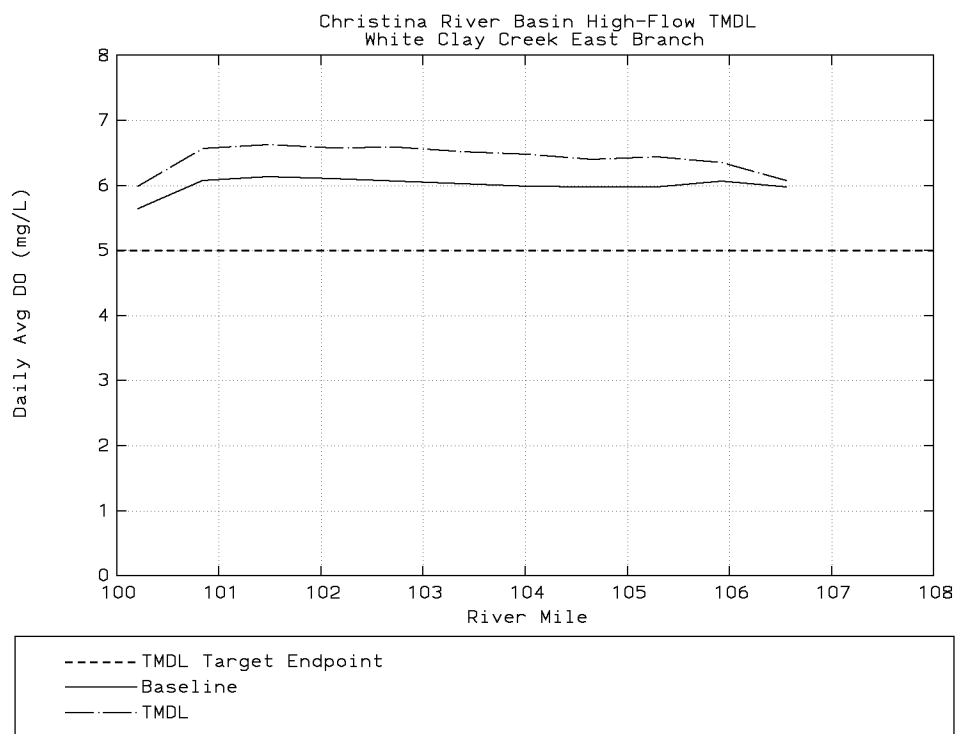


Figure D-21. Baseline and TMDL Daily Average DO, White Clay Creek East Branch

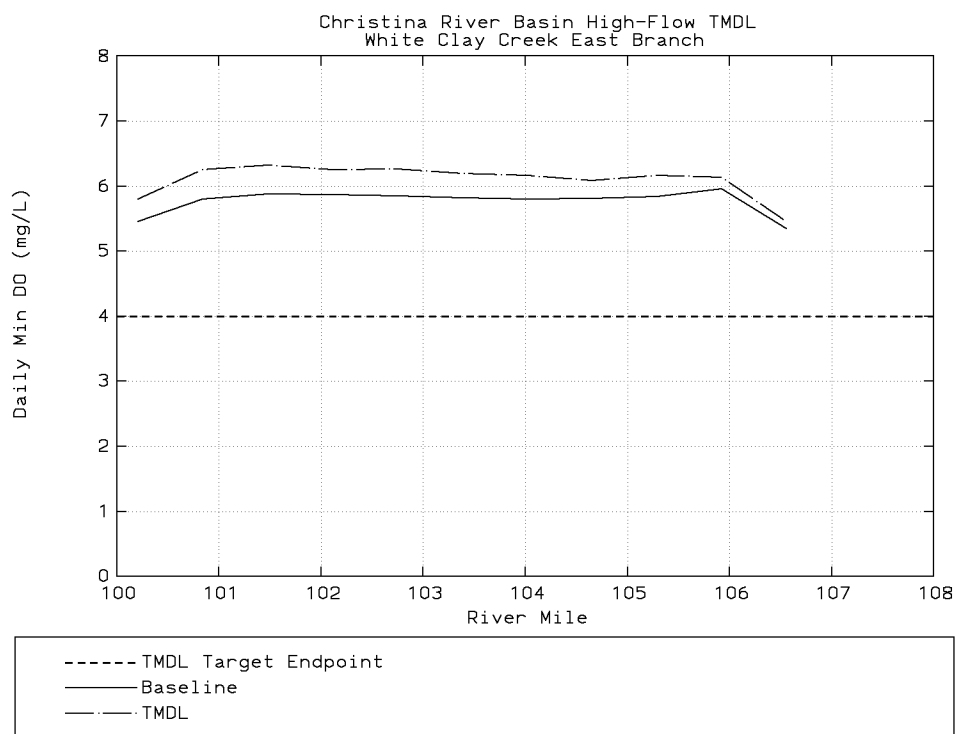


Figure D-22. Baseline and TMDL Minimum DO, White Clay Creek East Branch

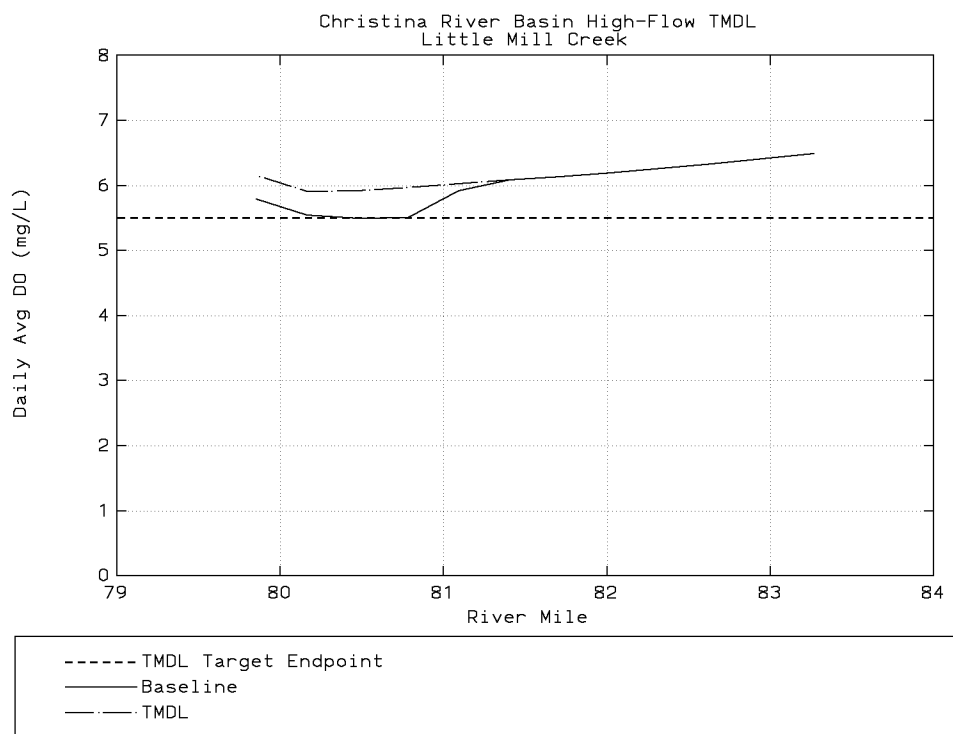


Figure D-23. Baseline and TMDL Daily Average DO, Little Mill Creek

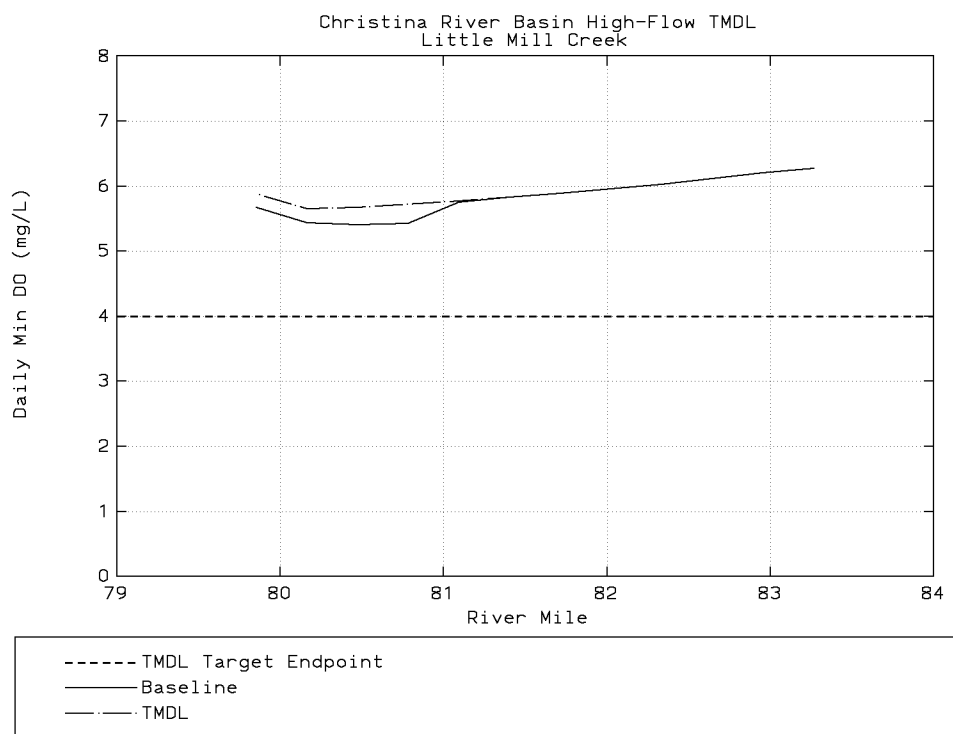


Figure D-24. Baseline and TMDL Minimum DO, Little Mill Creek

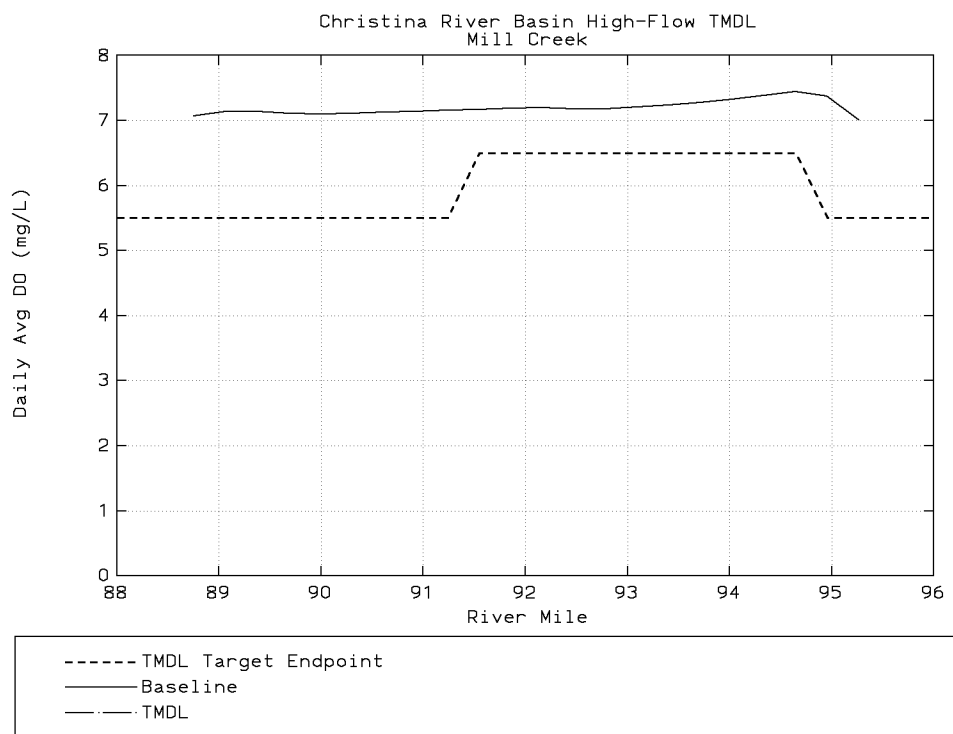


Figure D-25. Baseline and TMDL Daily Average DO, Mill Creek

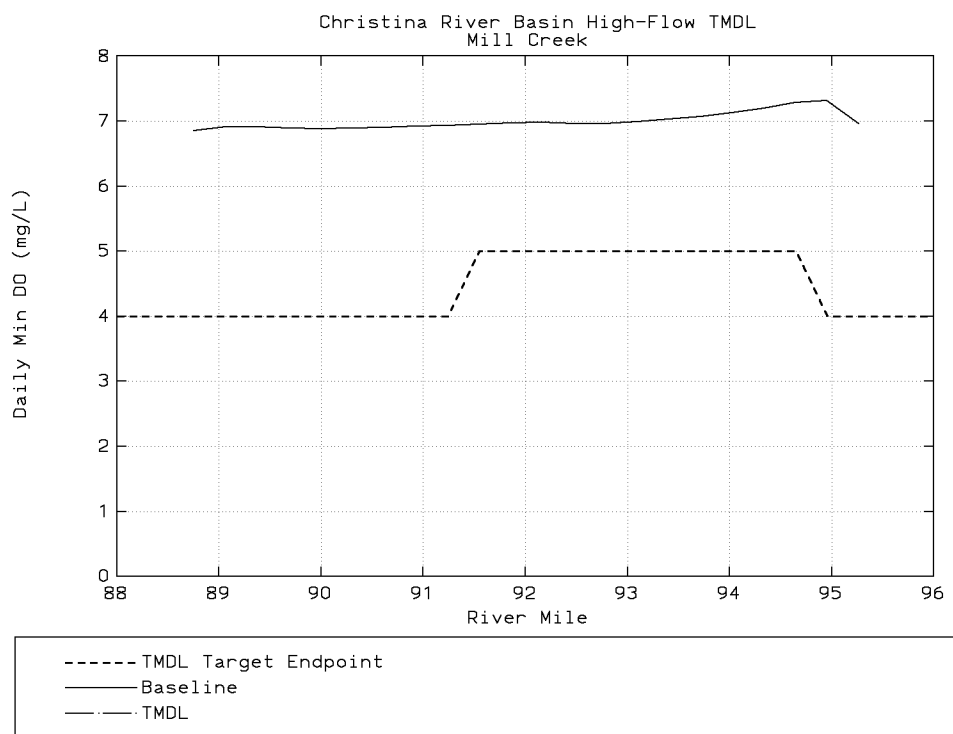


Figure D-26. Baseline and TMDL Minimum DO, Mill Creek

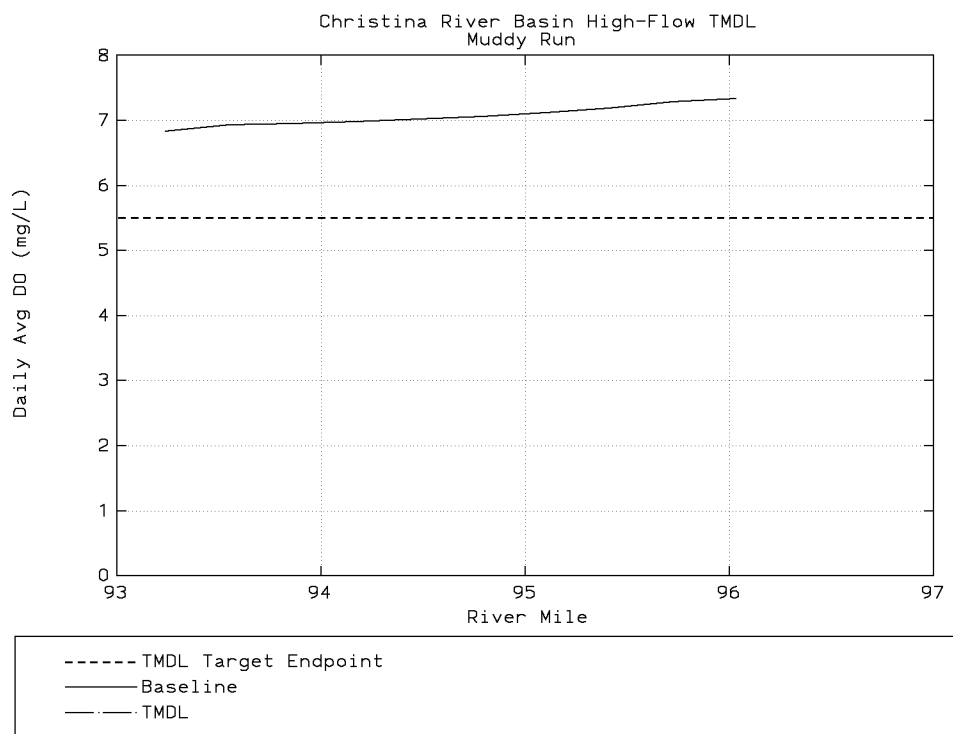


Figure D-27. Baseline and TMDL Daily Average DO, Muddy Run

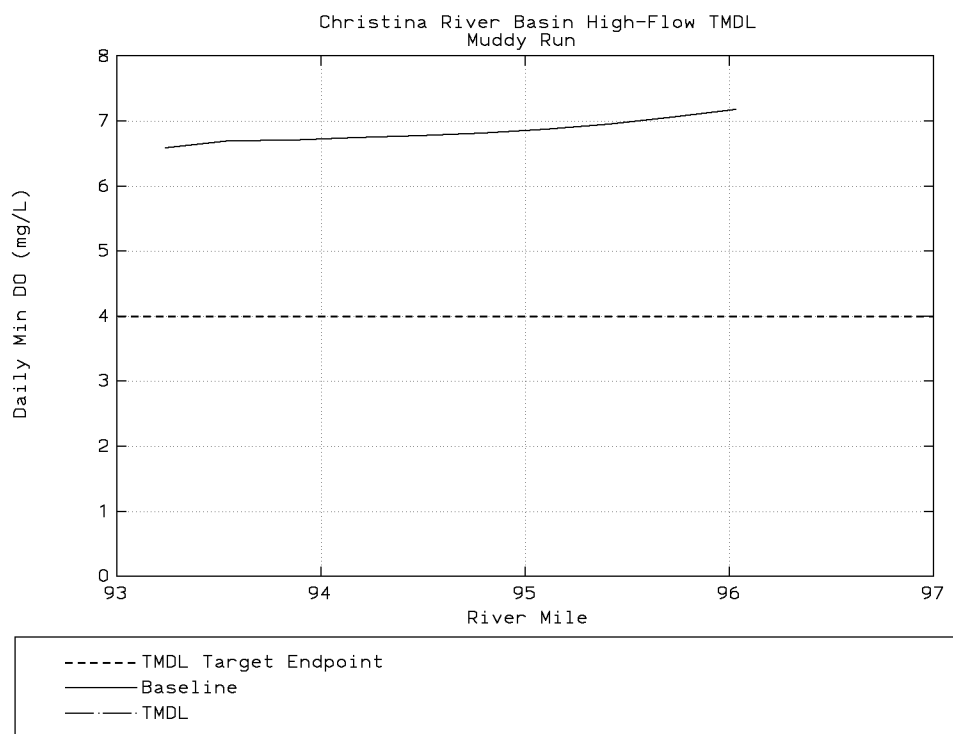


Figure D-28. Baseline and TMDL Minimum DO, Muddy Run



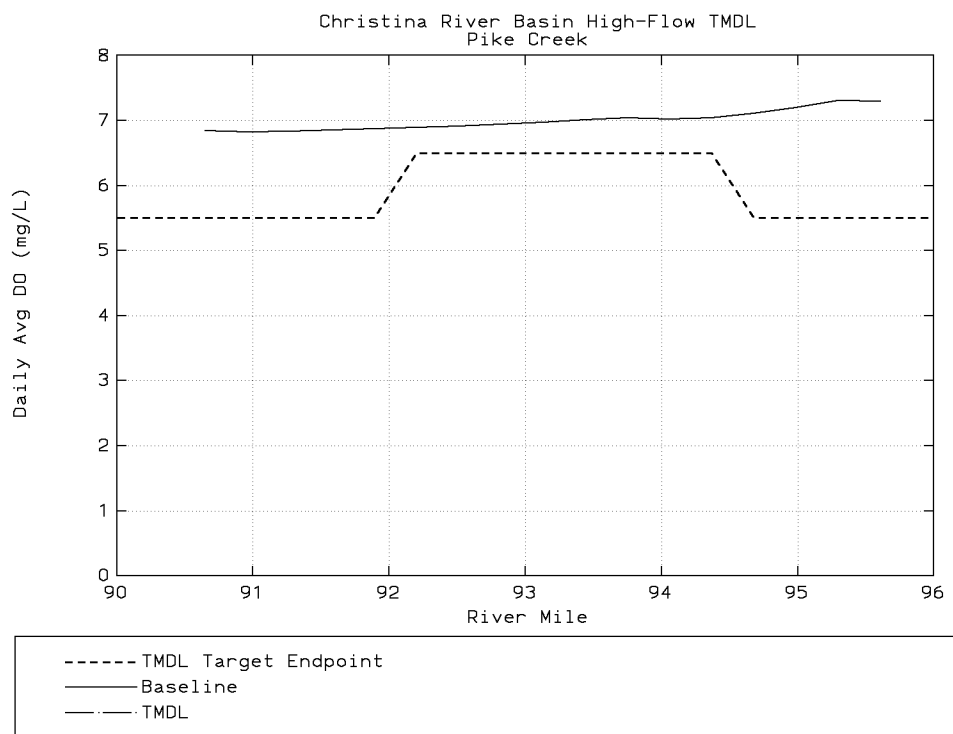


Figure D-29. Baseline and TMDL Daily Average DO, Pike Creek

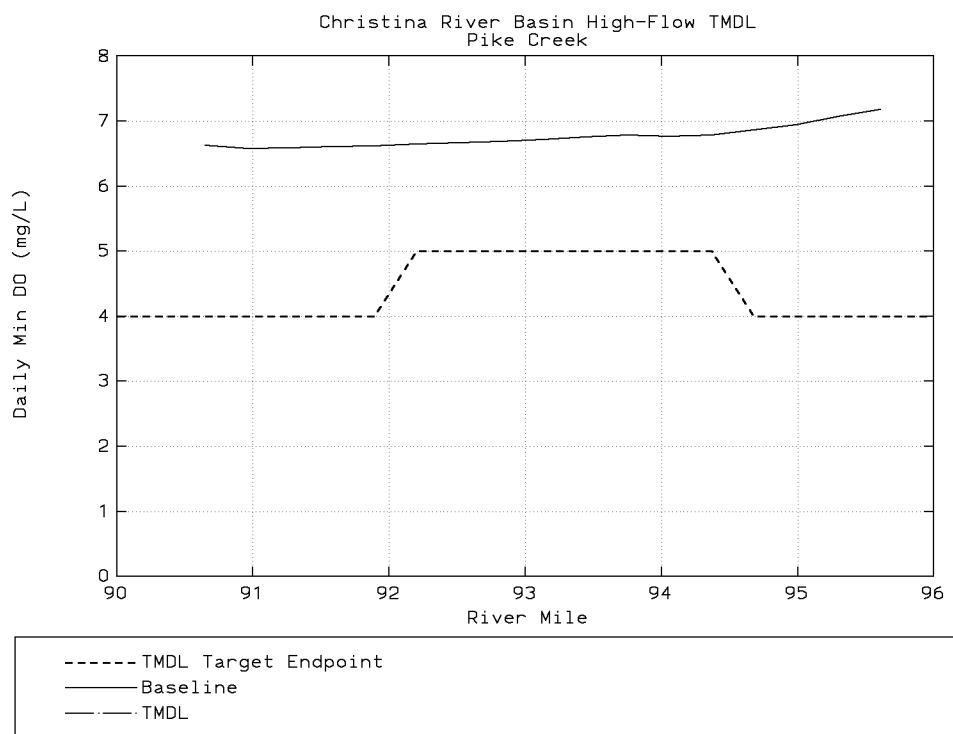


Figure D-30. Baseline and TMDL Minimum DO, Pike Creek

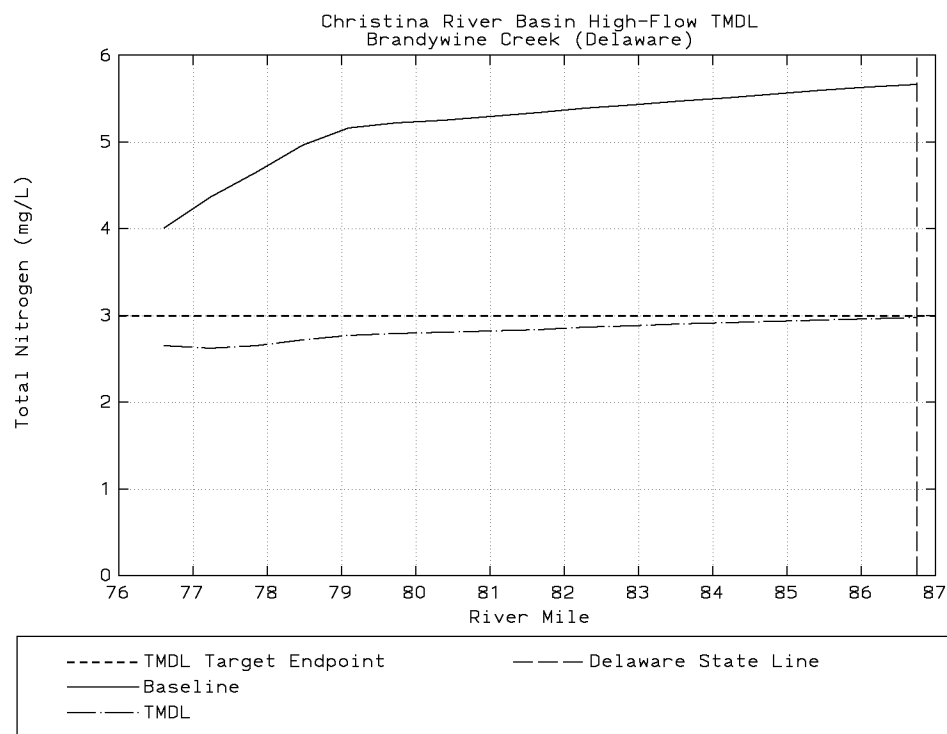


Figure D-31. Baseline and TMDL Total Nitrogen, Brandywine Creek (Delaware)

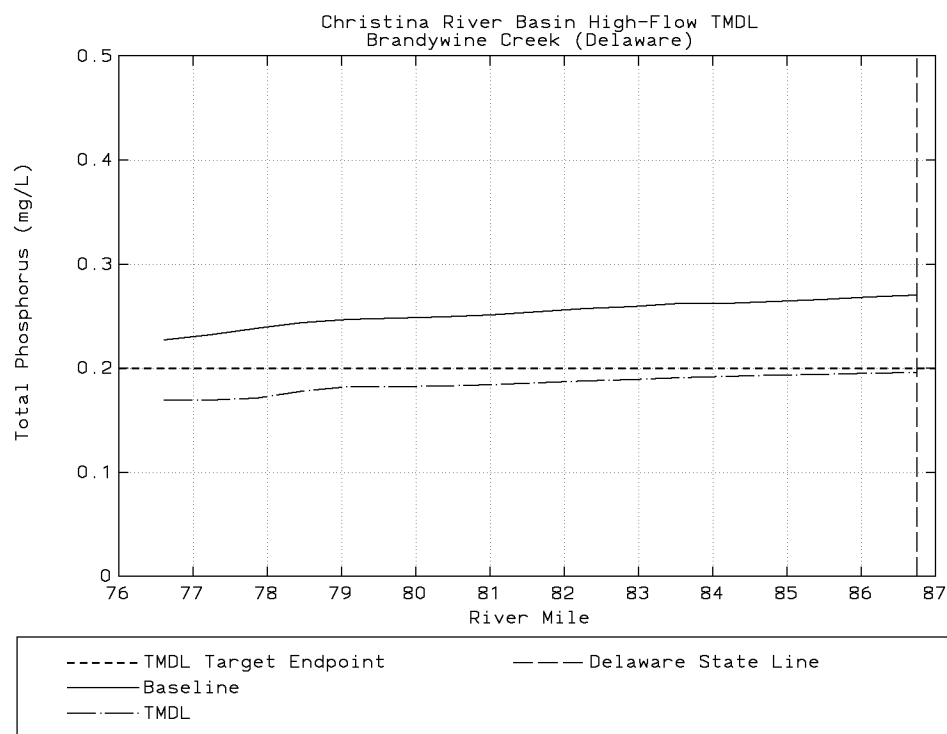


Figure D-32. Baseline and TMDL Total Phosphorus, Brandywine Creek (Delaware)

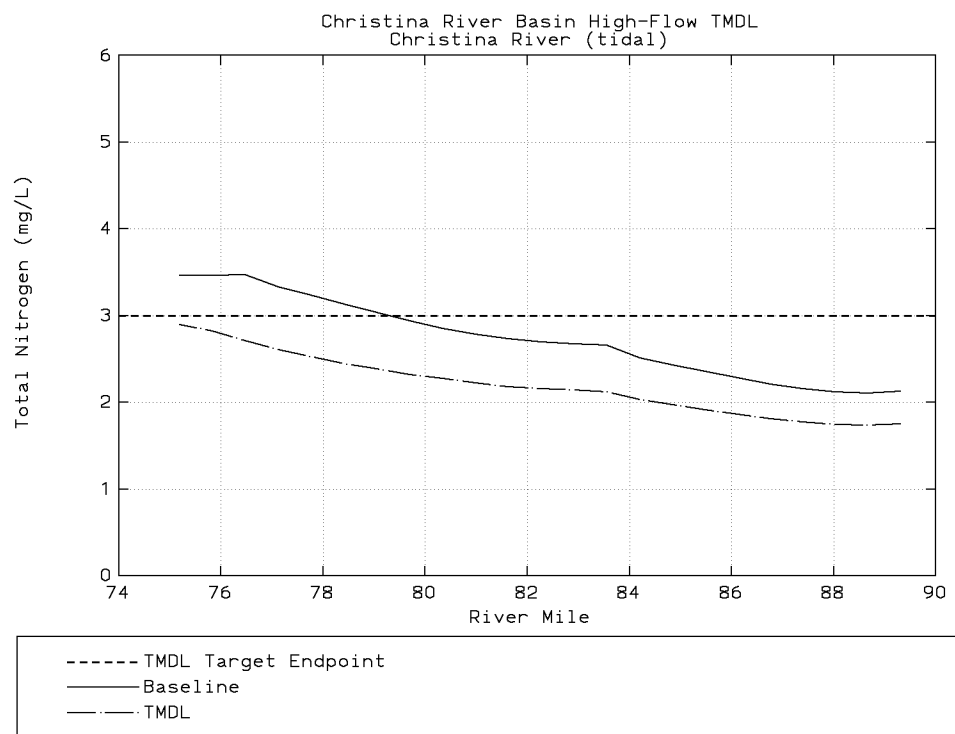


Figure D-33. Baseline and TMDL Total Nitrogen, Christina River (tidal)

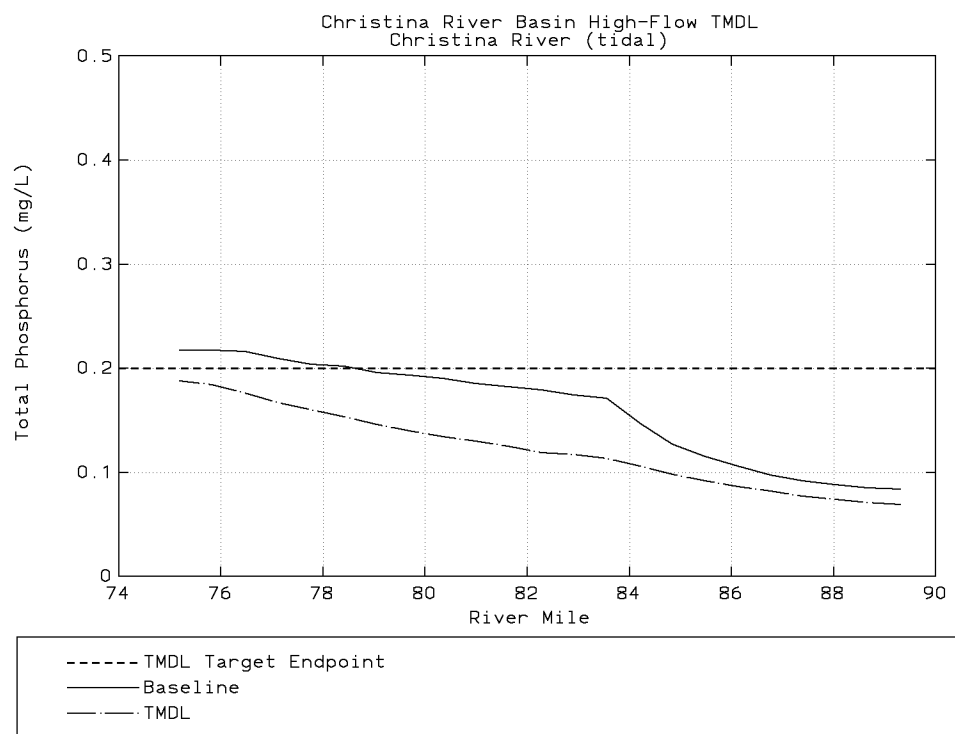


Figure D-34. Baseline and TMDL Total Phosphorus, Christina River (tidal)

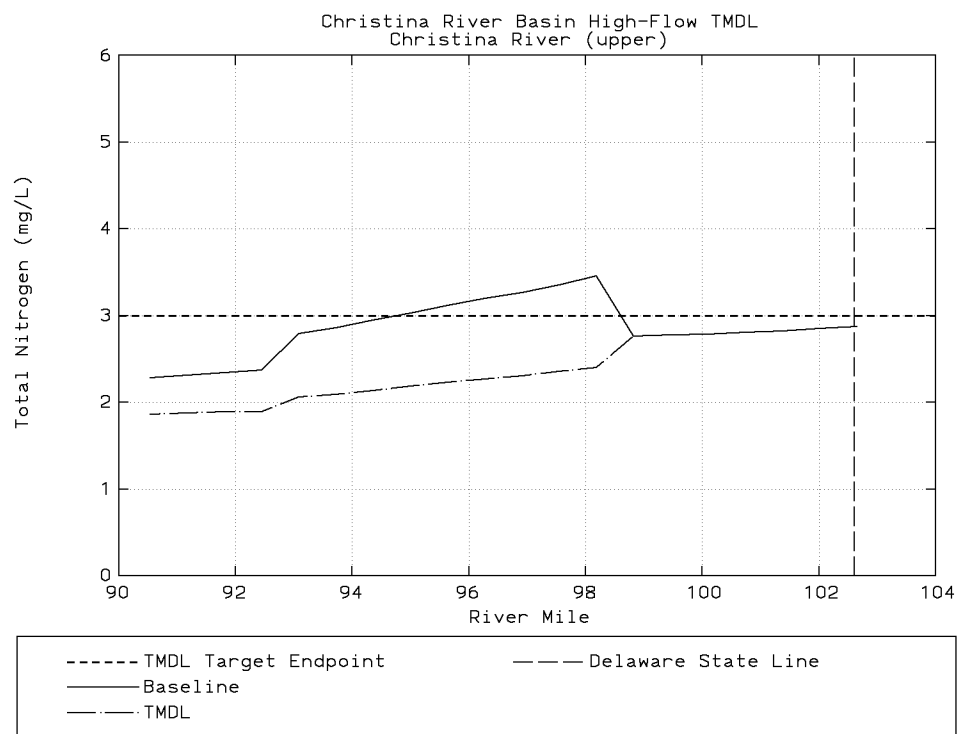


Figure D-35. Baseline and TMDL Total Nitrogen, Christina River (upper)

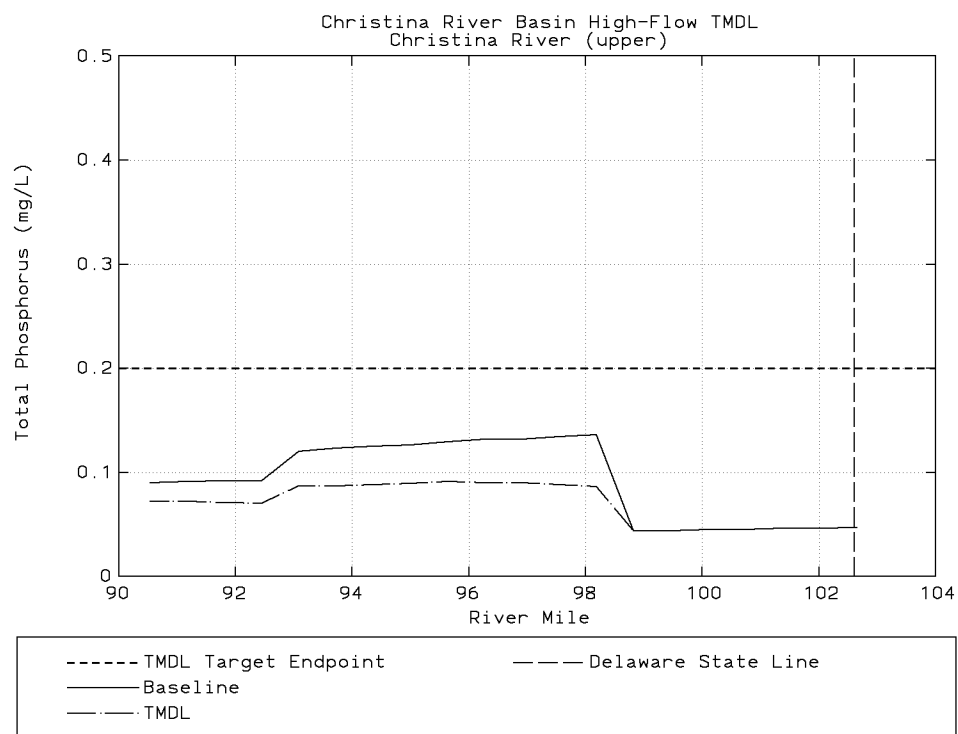


Figure D-36. Baseline and TMDL Total Phosphorus, Christina River (upper)

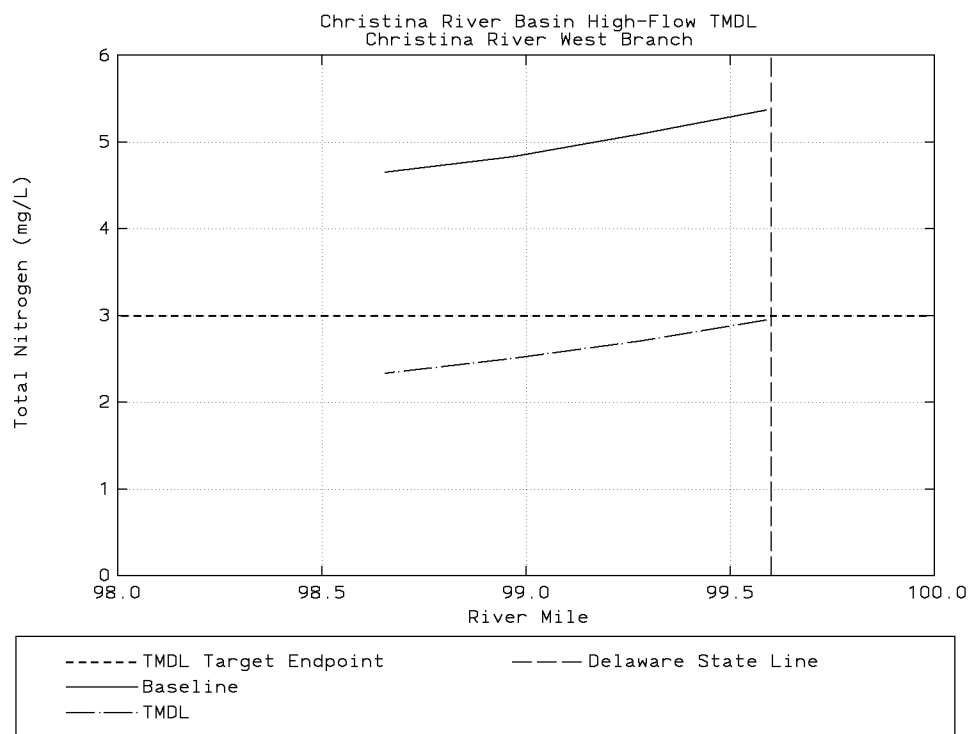


Figure D-37. Baseline and TMDL Total Nitrogen, Christina River West Branch

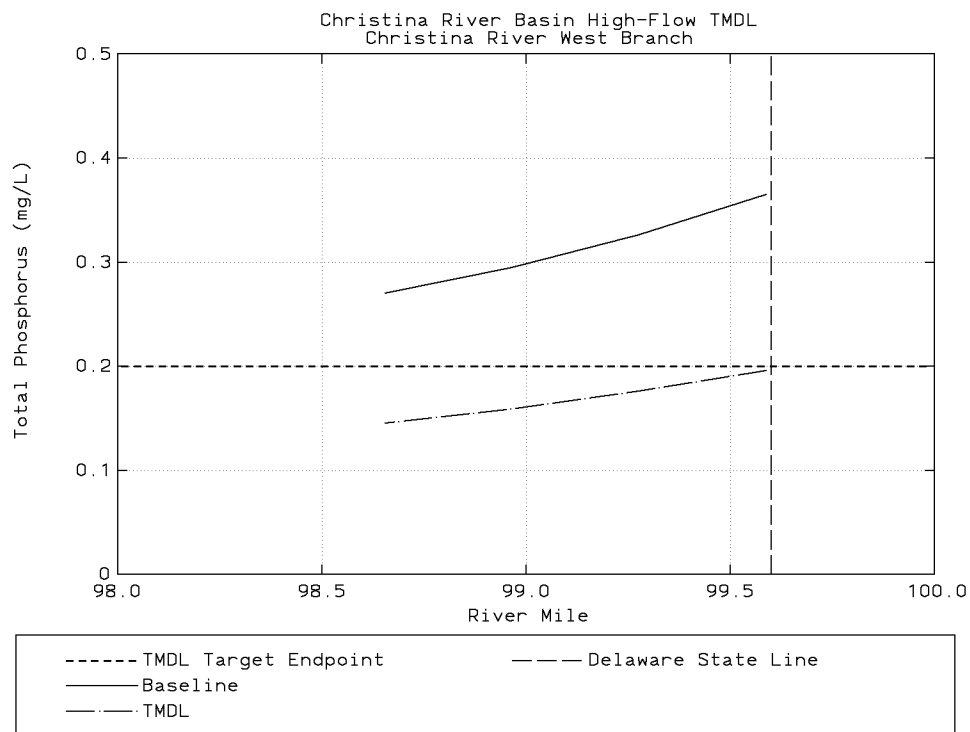


Figure D-38. Baseline and TMDL Total Phosphorus, Christina River West Branch

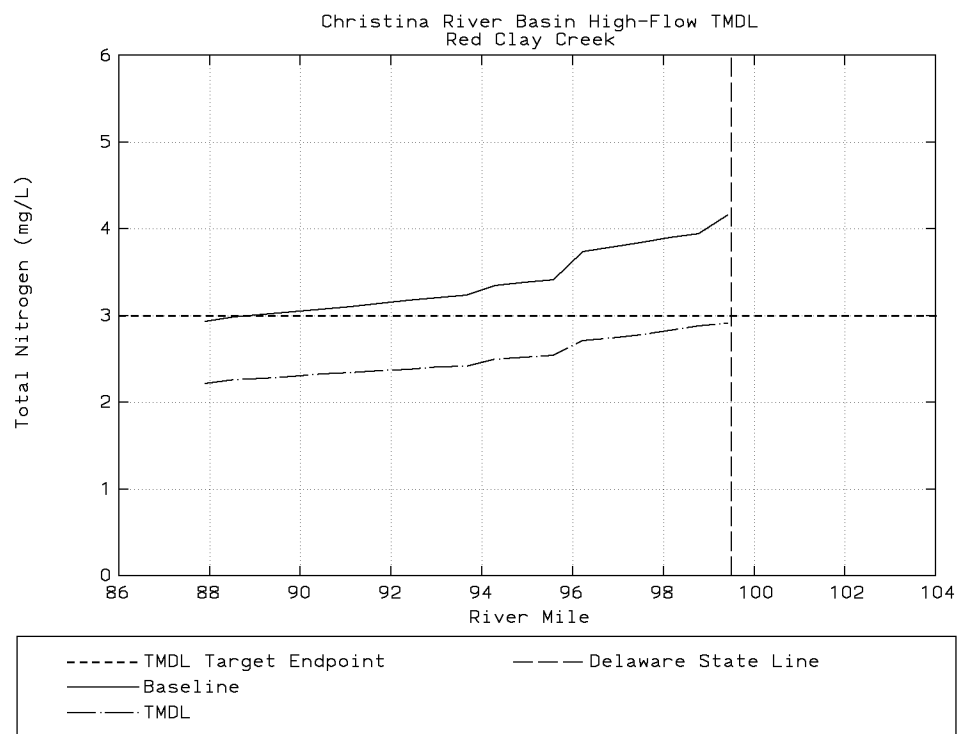


Figure D-39. Baseline and TMDL Total Nitrogen, Red Clay Creek

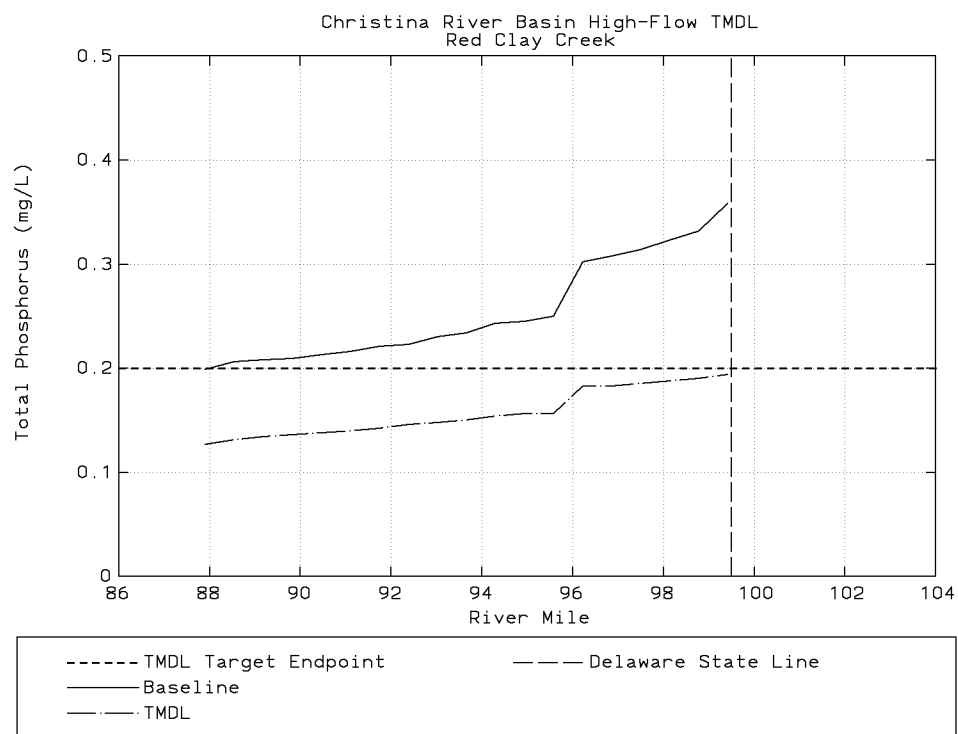


Figure D-40. Baseline and TMDL Total Phosphorus, Red Clay Creek

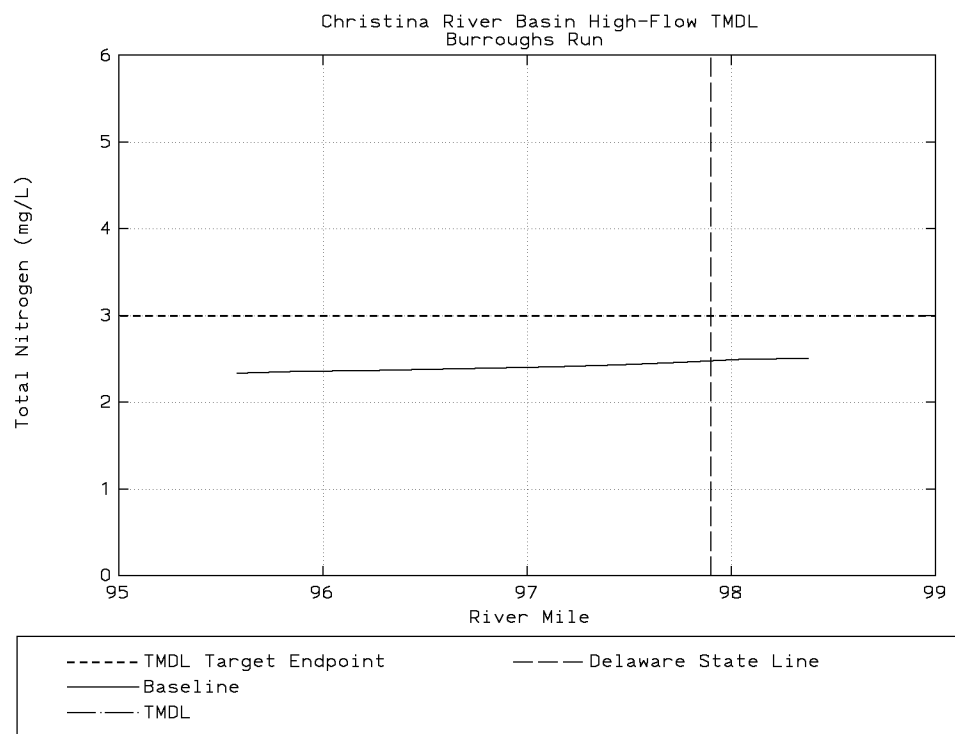


Figure D-41. Baseline and TMDL Total Nitrogen, Burroughs Run

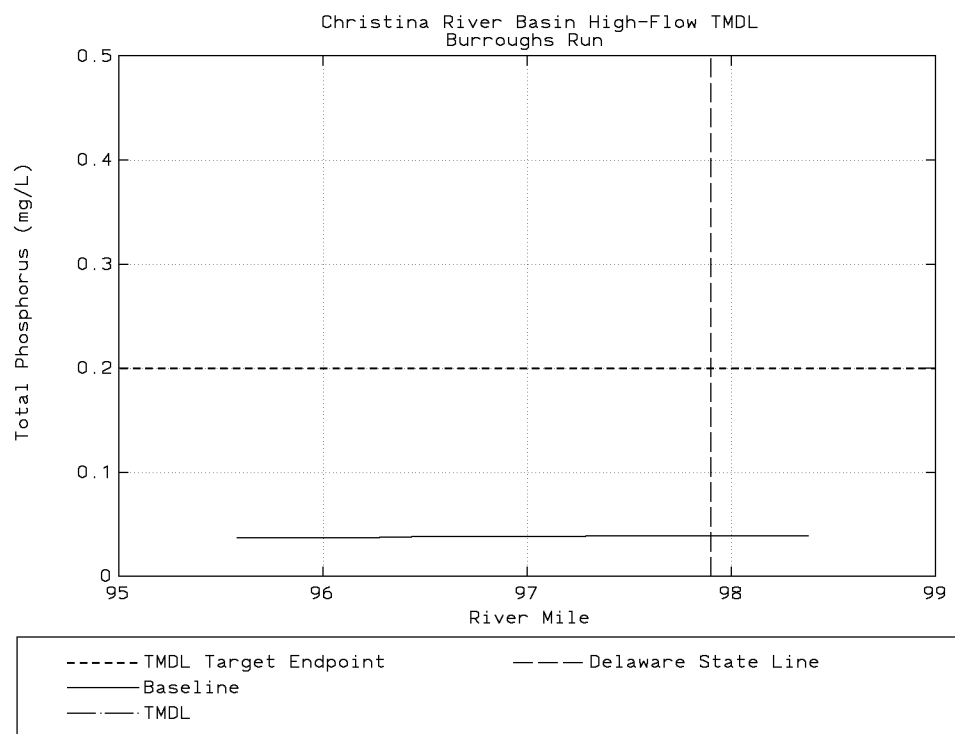


Figure D-42. Baseline and TMDL Total Phosphorus, Burroughs Run

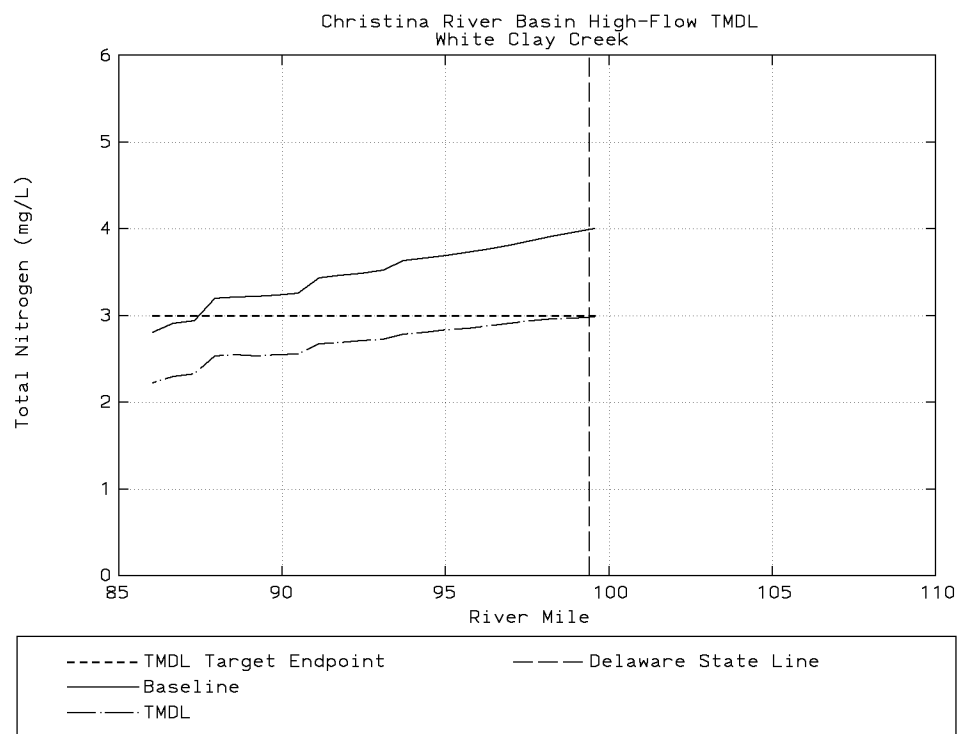


Figure D-43. Baseline and TMDL Total Nitrogen, White Clay Creek

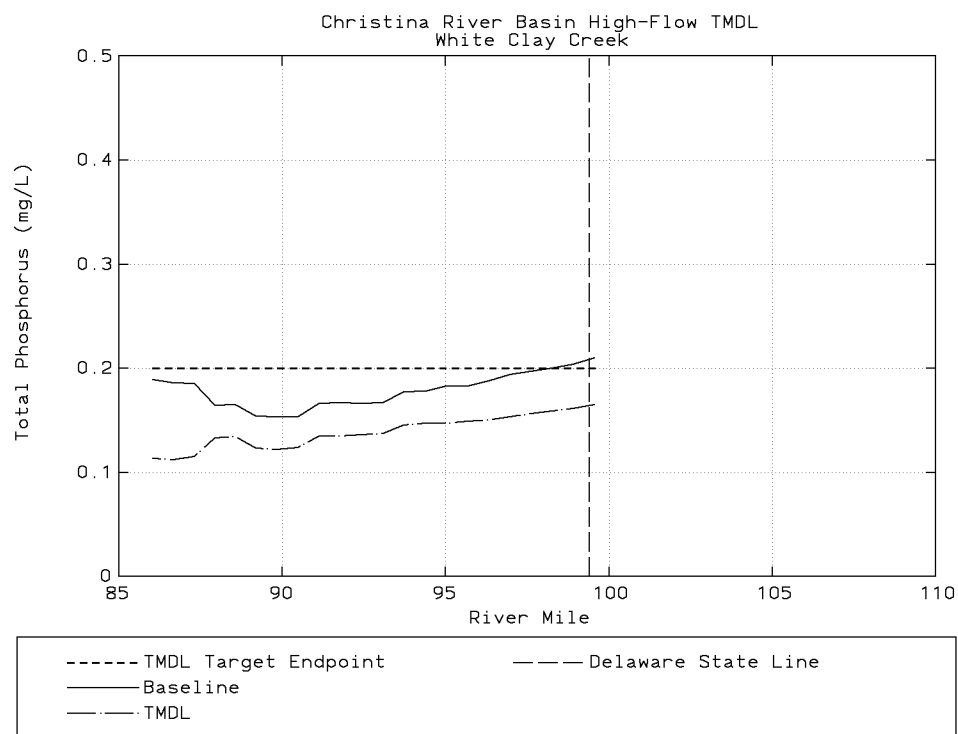


Figure D-44. Baseline and TMDL Total Phosphorus, White Clay Creek



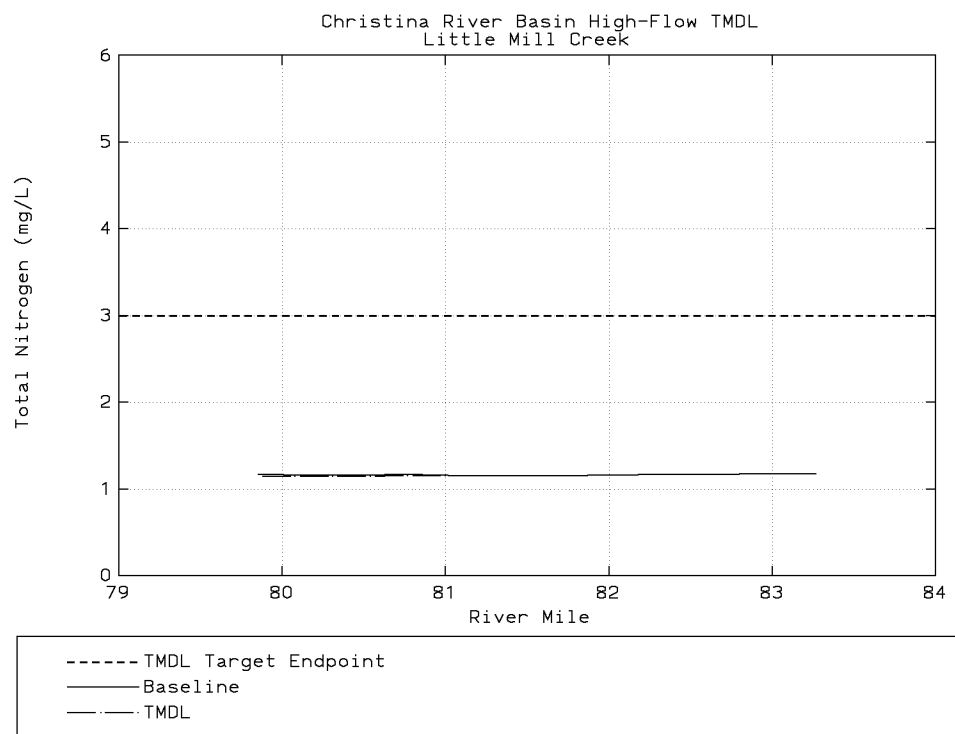


Figure D-45. Baseline and TMDL Total Nitrogen, Little Mill Creek

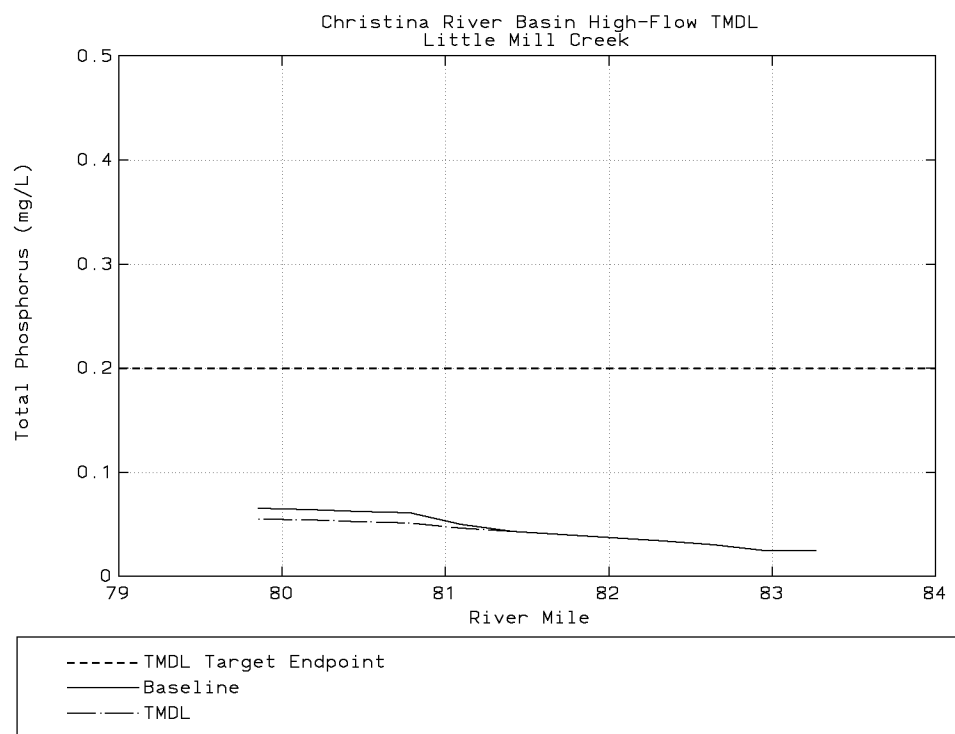


Figure D-46. Baseline and TMDL Total Phosphorus, Little Mill Creek

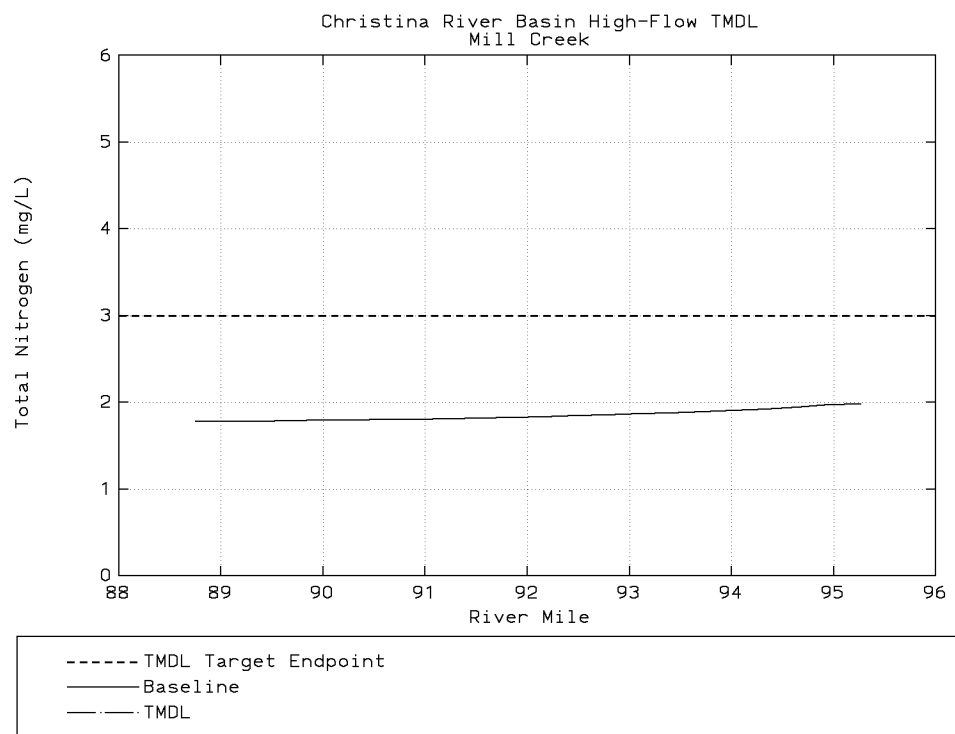


Figure D-47. Baseline and TMDL Total Nitrogen, Mill Creek

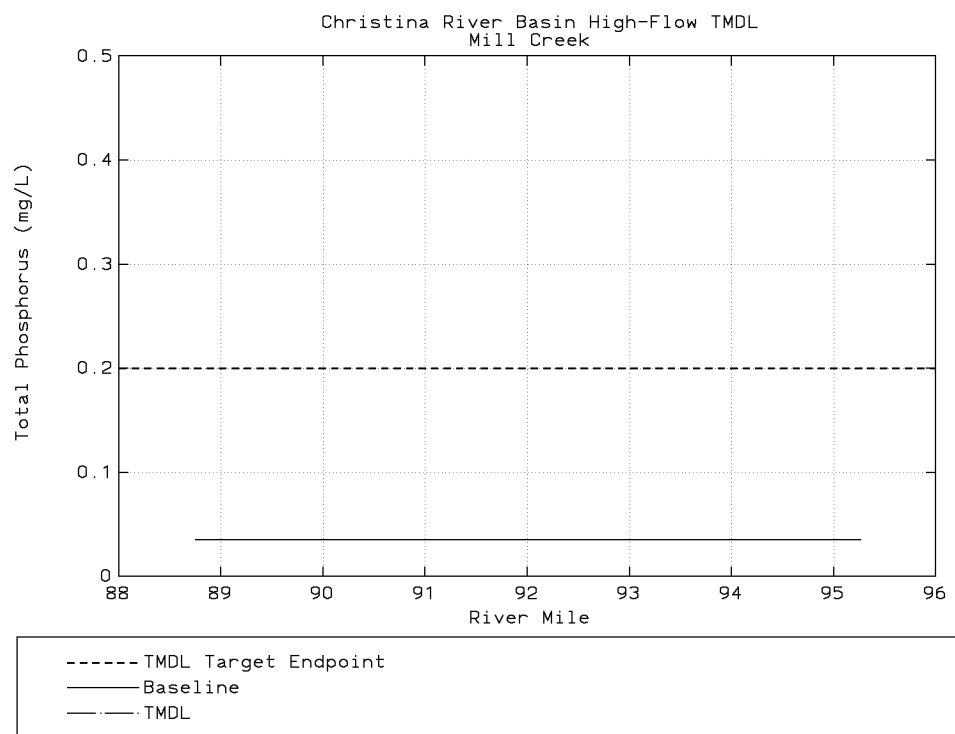


Figure D-48. Baseline and TMDL Total Phosphorus, Mill Creek

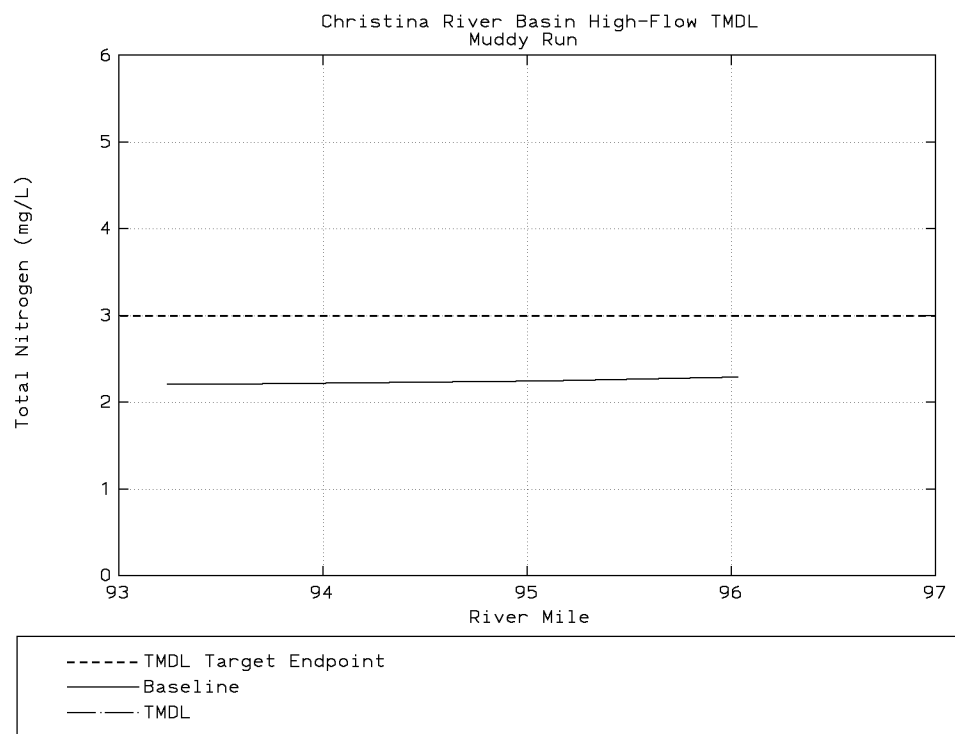


Figure D-49. Baseline and TMDL Total Nitrogen, Muddy Run

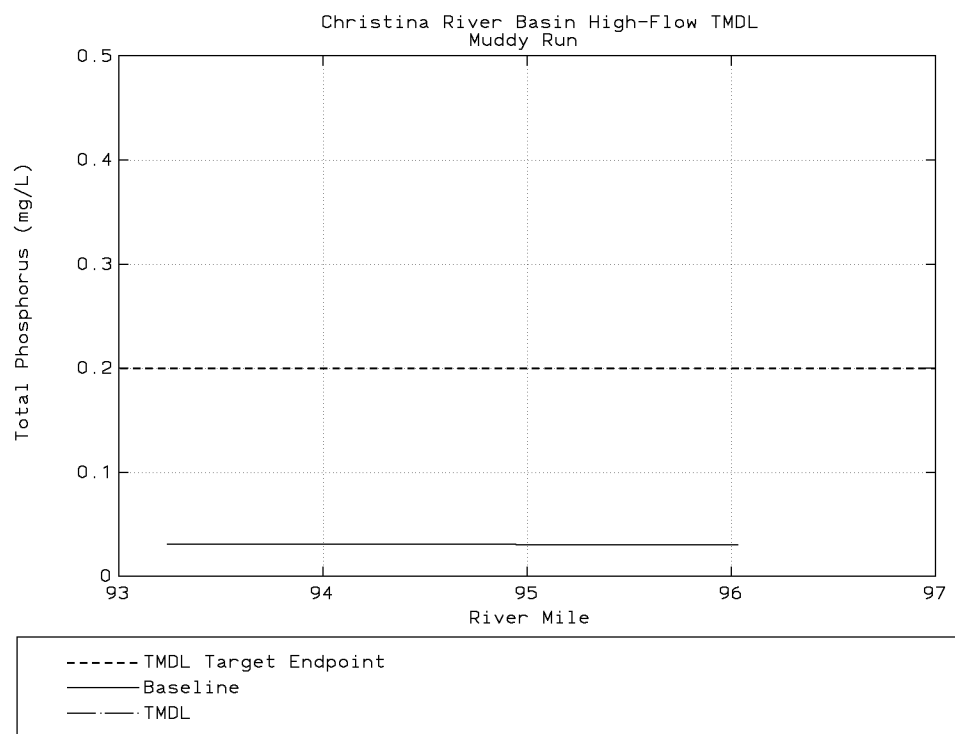


Figure D-50. Baseline and TMDL Total Phosphorus, Muddy Run

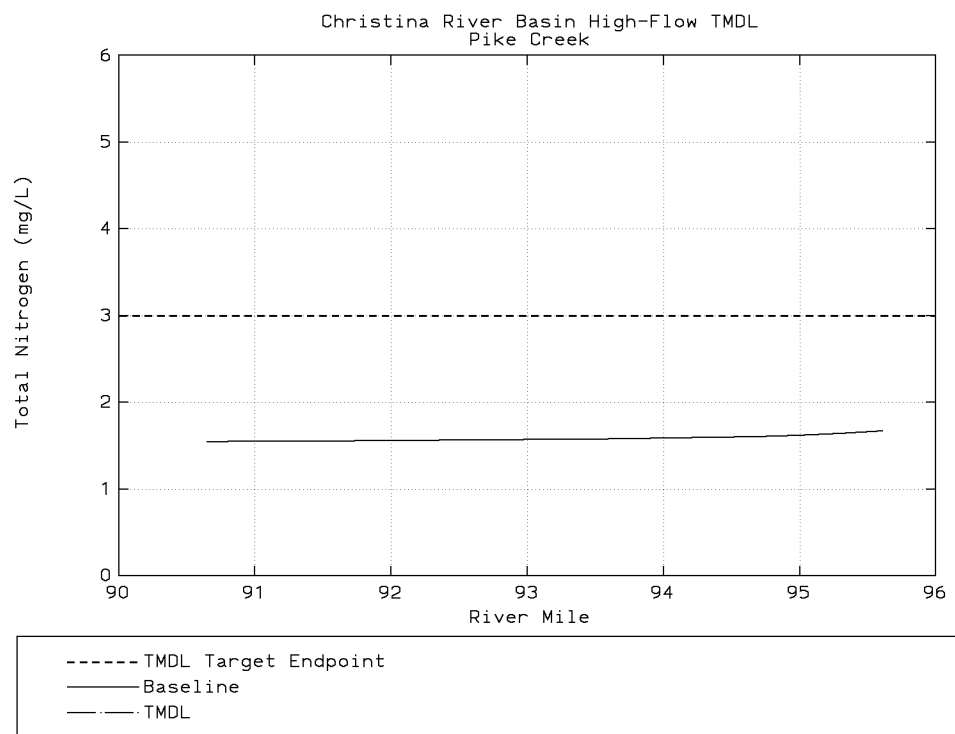


Figure D-51. Baseline and TMDL Total Nitrogen, Pike Creek

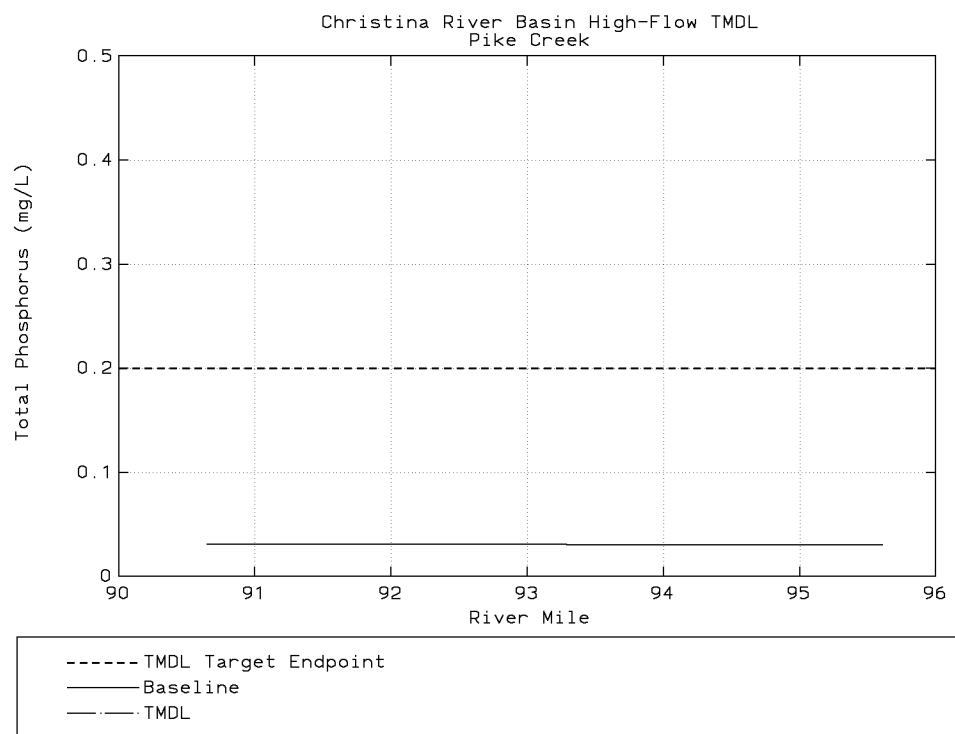


Figure D-52. Baseline and TMDL Total Phosphorus, Pike Creek